

FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
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Note: Design changes subsequent to publication of this report and prior to project advertisement will be documented by a memo inserted after the title page.

## GEOTECHNICAL REPORT NO. 24-99

## PROJECT PRA SHIL 502 (1) SHILOH NATIONAL MILITARY PARK HARDIN COUNTY, TENNESSEE

#### INTRODUCTION

#### General

This report presents the results of the geotechnical investigation for Project SHIL 502 (1) located at Shiloh National Military Park in Harding County, Tennessee. The project involves rehabilitation and reconstruction of 14.7 km of the park roads, parking areas, turnarounds and replacement of a small bridge with a bottomless structural plate pipe-arch culvert. A Project Location Map and Project Vicinity Map are presented in Appendix A.

### **Project Description**

## Brown's Landing Road (NPS Route 502)

Brown's landing road will be widened to accommodate two-way traffic from Hamburg-Savannah road to the Indian Mound palisades near the vicinity of the 17<sup>th</sup> Kentucky Infantry Monument. A new parking area and turnaround will be reconstructed at the Indian Mound palisades.

## Pittsburg Landing Road I (NPS Route 13)

Pittsburg Landing road I and turnouts will be overlaid with hot asphalt concrete pavement (HACP). The road will be relocated beginning east of Chambers Field and terminating near the front gate of the cemetery. Two concrete pads will be constructed for the vista off of Brown's Landing Road overlooking Pittsburg landing road.

The section of the maintenance service road extending between the existing and proposed Pittsburg Landing road I alignment at approximate station 21+360 will be reconstructed.

## Visitor Center and Cemetery Parking Areas

The existing main visitor center and cemetery parking areas will be reconfigured and reconstructed

#### Pittsburg Landing Road II

The retaining wall will be removed and a bus and 2-car turnaround will be constructed. The remaining portion of the road will be overlaid with HACP.

## Reconnoitering Road (NPS Route 500)

Reconnoitering road will be overlaid with HACP. The existing bridge on Reconnoitering road is 4.0 m long and 5.5 m wide bridge span that will be replaced with a bottomless structural plate arch pipe 4.4 m long by 9.5 m wide in order to accommodate a travel lane and a pedestrian and bike sidewalk.

## Corinth-Pittsburg Landing Road (NPS Route 12)

Corinth-Pittsburg is currently a reinforced portland cement concrete (RPCC) paved road. The RPCC pavement will be rehabilitated including cleaning and sealing of the transverse and longitudinal joints and repairing of the transverse cracks.

#### New Entrance Road

A new entrance road will be constructed from Pittsburg landing road I to Corinth-Pittsburg landing road on an existing surface treated road.

#### McClernand Road

A portion of McClernand road will be overlaid with HACP and a portion will be realigned.

#### Eastern Corinth road I (NPS Route 14)

Eastern Corinth road will be overlaid with HACP between station 10+000 and 11+115 during this phase of the project the remainder of this road will be rehabilitated under a future project. It's intersection with Peabody Road and Bark Road will be reconfigured.

#### Peabody Road (NPS Route 501)

Peabody road will be overlaid with HACP. The gravel tour stop area located left of station 11+000 will be reconstructed.

#### Hamburg-Savannah Road (NPS Route 11)

Hamburg-Savannah road will be overlaid with HACP. The two-car turnout right of station  $11+330 \pm \text{will}$  be paved. Rehabilitation of the following parking areas and roadway located off of Hamburg-Savannah road will be performed.

#### New One-way Loop Around Tent Hospital Site

A new one-way loop will be constructed from station 10+050 to a dirt road along the northeast park's boundary then back to the Tent Hospital site access road.

#### Johnston Memorial

Johnston memorial will be overlaid with HACP. A two-bus turnout will be constructed to the northeast of the existing loop.

## Peach Orchard Parking Area

The northern end of the parking will be widened to improve accessibility for the buses.

## **Bloody Pond Tour Stop**

The roadway and the two turnouts at Bloody Pond tour stop will be reconstructed.

### Regional Geology

The project site is located within the Gulf Coastal Plain physiographic province. The majority of the project site is underlain by high-level alluvial deposits which consist of iron stained gravel, sand, silt and clay; variable in thickness but generally less than 18 m thick. Alluvial deposits and the Coffee Sand formations underlie the site in the flood plain areas parallel to the Tennessee River. The alluvial deposits consist of sand, silt, clay and gravel and range in thickness between 6 m to more than 30 m. The Coffee Sand formation consists of loose fine-grained sand, light-gray, glauconitic, micaceous; interbedded with laminated lignitic clay. The thickness of the Coffee Sand formation varies between 7 and 61 m.

The majority of the near-surface soils at the site are of the Paden-Pickwick-Waynesboro association. This association consists of moderately well drained soils and well drained soils on high terraces. Paden and Pickwick soil series make up about 70 percent of the association. The surface layer is loam and silt loam. The subsoil is chiefly silty clay loam and clay loam. The Waynesboro series consists of fine sandy loam and gravelly sandy loam. The near-surface soils adjacent to the Tennessee River are of the Wolftever-Beason-Egam association. This association consists of nearly level soils on low stream terraces and flood plains of the Tennessee River. The surface layer consists of dark grayish-brown to brown silt loam and varies in depth between 0.45 and 0.8 m. The substratum is brown or yellowish-brown silt loam with varying amounts of chert.

#### PROCEDURES AND RESULTS

The field investigation for this project consisted of a generalized pavement condition survey and a subsurface exploration program. General procedures used during performance of the field investigations are expounded as follows:

## **Pavement Condition Survey**

Pavement condition surveys were conducted by Eastern Federal Lands Highway Division (EFLHD) geotechnical personnel during August, 1996 and August 1999. The pavement condition surveys were conducted in general accordance with the "Distress Identification Manual for the Long-Term Pavement Performance Project (SHRP-P-338)". The purpose of the pavement condition surveys was to make a preliminary determination of the types and limits of the different reconstruction or rehabilitation techniques that would be required based on the type, severity and extent of pavement distress.

### **Soil Borings**

The subsurface exploration program was conducted by EFLHD geotechnical personnel during August 1996, consisting of sixty six borings. Borings were drilled using a trailer-mounted CME 45 drill rig. Approximate locations of each boring are shown on the Boring Location Plans in Appendix B. Borings were advanced using hollow-stem augers to depths ranging from 1.35 to 4.98 meters. Pavement cores were obtained at 11 locations.

## Sampling

Sampling of materials beneath the tip of the hollow-stem augers was performed in each boring through the auger stem as the borings were advanced. Representative soil samples were retrieved using 50 mm outside diameter split-barrel sampler in accordance with AASHTO T200-87. Sampling was typically conducted continuously to the termination depth of all borings. Representative portions of split-spoon samples were preserved in glass jars for laboratory testing. Additionally, five bulk samples of auger cuttings were collected from Borings VC-6, R-2, RS-3, T-4 and BL-3. The sampling sequence and associated jar and bag samples for each boring are presented on its appropriate Boring Log in Appendix C.

#### Field Tests and Measurements

The following field tests and measurements were performed by exploration personnel during the course of the subsurface exploration. Boring locations were determined from features present on site. Standard penetration tests (SPT) were performed and resistance was recorded during the recovery of each split barrel sample, in accordance with AASHTO T206-87. The sampler was driven into the soil using an automatic hammer. Sample recovery measurements were made and recorded for each sampling attempt. Asphalt and base thickness were measured for each pavement encountered. The relative consistency of each cohesive soil sample was estimated using a calibrated pocket penetrometer. A field description by color and texture was made for each recovered soil sample. The depth of groundwater, if present, was measured at the time of completion of each boring, and again prior to backfilling the boreholes.

### **Data Summary**

The results of the field tests and measurements were recorded on the drillers logs and appropriate

data sheets in the field. These data sheets and logs contain information concerning the boring methods; samples attempted and recovered; indications of the presence of various materials such as gravel, pebbles, organic matter, etc. They also contain interpretations by the exploration foreman of the conditions between samples based on the performance of the equipment and cuttings brought to the surface by the drilling tools. Therefore, the field data represents both factual and interpretative information.

The Boring Logs in Appendix C of this report represent a compilation of field and laboratory data and descriptions of the soil and rock samples by a geotechnical engineer. Occasionally, these records do not include all data recorded on driller's logs and field data sheets, but do include all information considered relevant to the design and construction of this project.

## Laboratory Investigation

At the conclusion of the field work, laboratory testing was conducted on select representative soil samples. Laboratory tests included gradation (AASHTO T-27), Atterberg limits (AASHTO T-89, T-90), classification (AASHTO T-317) and moisture content (AASHTO T-265). Five bulk samples from Borings VC-6, R-2, RS-3, T-4 and BL-3 were tested for the California Bearing Ratio (AASHTO T-193) and Standard Proctor tests (AASHTO T-99), including maximum dry density and optimum moisture content. The results of the laboratory tests on the jar and bulk samples are presented in Appendix D. The results of the laboratory tests on the bulk samples are summarized in Table 1.

TABLE 1 - BULK SAMPLES LABORATORY TEST DATA

Boring No.	AASHTO Classification	Liquid Limit	Plasticity Index	Percent Fines	Optimum Moisture Content %	Maximum Dry Density (kN/m³)	CBR
BL-3	A-4	25	6	57	10.7	19.1	11
PLI-3	<b>A-</b> 6	35	18	83	14.0	18.4	7
VC-6	A-7-6	48	29	77-	16.3	17.9	6
R-2	A-7-6	50	26	44	13.8	18.5	8
RS-3	<b>A-</b> 6	29	11		15.8	18.1	8
T-4	A-7-6	31	13	74	11.3	19.46	7

## **Findings**

Findings for each site are described below. A summary of the pavement borings is listed in Tables D-1 through D-5 in Appendix D. Included in those tables are the existing AC, RPCC (where present) and aggregate base thicknesses and subgrade material classification encountered at each boring.

### Brown's Landing Road (NPS Route 502)

Borings BL-1 through BL-3 were drilled at offset locations from the roadway pavement for the proposed widening of Brown's Landing road. Borings BL-4 and BL-5 were drilled for the proposed parking lot and turnaround at Indian Mound palisades in the vicinity of the 17<sup>th</sup> Kentucky Infantry Monument.

Brown silty clay with some sand and trace of chert (A-4, A-6) was encountered in all borings. A brown silty sand with trace of chert layer was encountered to a depth of 0.61 m in Boring BL-1 (A-2-4). Moisture contents varied from 3.7 to 26.3%. Liquid limit ranged from 42 to 52, plasticity indices from 12 with 18 and 48 to 61% fines. Standard Penetration Test (SPT) resistances encountered within the silty clay ranged from 3 to 19 blows per 300 mm suggesting soft to very stiff consistencies. Laboratory test results for the Bulk sample are presented in Table 1.

The pavement generally contains low to moderate severity fatigue and longitudinal cracking at a few locations between the intersection of Browns Landing and Eastern Corinth roads and the Indian Mounds palisades.

## Pittsburg Landing Road I (NPS Route 13)

The AC thickness encountered in Borings PLI-1 through PLI-5 varied between 70 to 110 mm overlaying 40 to 120 mm of aggregate base.

Red and brown clay with varying amounts of silt and traces of sand (A-6) was encountered in all borings. Laboratory test results indicate moisture contents between 12.0% and 20.3%, liquid limits between 28 and 39, plasticity indices between 12 and 22 with 40.7% to 82.9% fines. SPT resistances encountered ranged from 5 to 25 blows per 300 mm suggesting medium stiff to very stiff consistencies. Borings PLI-9, PLI-10 and PLI-11 were drilled in the proposed relocation section of the road east of Chambers Field to the Visitor and Cemetery parking areas. Laboratory test results for the bulk samples are presented in Table 1. Four pavement cores were obtained from Borings PLI-6 through PLI-8 and PLI-12.

The pavement generally contains low to moderate fatigue cracking at a few locations within the roadway.

Boring V-1 was drilled for the vista off Brown's Landing road. Brown silt with trace sand, clay and chert (A-4) was encountered to the termination depth of 2.95 m. Laboratory test results indicate a natural moisture content of 18.5%, a liquid limit of 32, non-plastic plasticity index and 85.0% fines. SPT resistances varied from 3 to 81 blows per 300 mm indicating soft to hard consistencies.

Boring S-1 was drilled in the maintenance service road between the existing and proposed Pittsburg Landing road I alignments. The AC thickness encountered in Boring S-1 was 90 mm underlain by 100 mm aggregate base.

Beneath the pavement, brown clay with trace silt and sand (A-7-6) was encountered to the termination depth of 1.52 m. Laboratory test results indicate a natural moisture content of 15.4%, a liquid limit of 45, a plasticity index of 27 and 90.4% fines. SPT resistances ranged from 32 to 39 blows per 300 mm indicating hard consistency.

## Visitor Center and Cemetery Parking Areas

The AC thickness encountered in Borings VC-1 through VC-6 varied between 70 to 130 mm overlaying 90 to 220 mm of aggregate base.

Brown and red clay and silty clay with trace to some fine to medium sand (A-6) was encountered in all borings. Laboratory test results indicate a natural moisture content of 9.3%, a liquid limit of 30, a plasticity index of 6 with 38.4% fines. SPT resistances encountered ranged from 5 to 38 blows per 300 mm indicating medium stiff to hard consistencies.

The pavement generally contains low to moderate severity fatigue and longitudinal cracking at a few locations within the parking area.

## Pittsburg Landing Road II

The AC thickness encountered in Borings PLII-1 through PLII-3 varied between 70 and 90 mm overlaying 70 to 120 mm of aggregate base.

Beneath the pavement in Boring PLII-3, fill and/or disturbed soils consisting of silty sand and clay with trace of chert (A-2-4) were encountered to a depth of 1.52 m. Laboratory test results indicate natural moisture content ranged from 11.3% to 11.8%, liquid limits from 21 to 24, a non-plastic plasticity index with 25.5 to 27.3% fines. SPT resistances encountered within the fill varied from 3 to 7 blows per 300 mm, generally suggesting very loose to loose conditions.

Red and brown clay with varying amounts of silt (A-4) was encountered to the termination depth of Borings PLII-1, PLII-2 and below the fills in Boring PLII-3. Laboratory test results indicate natural moisture contents ranged from 12.4% to 18.2%, liquid limits from 32 to 34, plasticity indices from 15 to 17 and 82.6 to 85.0 percent fines. SPT N-values ranged from 6 to 13 blows per 300 mm, generally indicating medium stiff to stiff consistencies.

The pavement generally contains low severity fatigue and block cracking.

#### Reconnoitering Road

The AC thickness encountered in Borings R-1 through R-3 was 80 mm overlaying 60 to 70 mm of aggregate base.

Beneath the pavement, reddish brown and brown clay with some silt and trace fine sand (A-7-6) was encountered to the termination depth of all borings. Laboratory results indicate natural moisture contents ranged from 17.2% to 18.8, liquid limits from 47 to 48, plasticity indices from

22 to 26 with 79.4 to 85.4% fines. SPT resistances encountered ranged from 9 to 29 blows per 300 mm suggesting stiff to very stiff consistencies.

The pavement generally contains minimal low severity fatigue and longitudinal cracking.

## Bridge Replacement on Reconnoitering Road

Borings BB-1 and BB-2 were drilled for the foundations of the replacement bridge/culvert. Brown and gray silty sand and sand with trace weathered rock fragments and clay (A-2-4) was encountered to a depth of 2.54 m in Boring BB-1 and to the bottom of Boring BB-2. SPT resistances varied between 2 to 30 blows per 300 mm indicating very loose to medium dense conditions. In Boring BB-2, a high SPT resistance of 65 blows per 300 mm was encountered at an approximate depth of 2.0 m. This high SPT resistance is suspected to be because a random boulder was encountered and is not representative of the general subsurface conditions.

Beneath the sands in Boring BB-1, brown and gray silty clay with trace sand (A-7-6) was encountered to the termination depth of 4.98 m. Laboratory test results indicate a natural moisture content of 38%, a liquid limit of 71, a plasticity index of 44 with 90.0% fines. SPT resistances varied from 2 to 6 blows per 300 mm suggesting very soft to medium stiff consistencies.

## Corinth-Pittsburg Landing Road

RPCC thickness in Borings CP-1 through CP-12 varied between 120 to 160 mm. No aggregate base was encountered in any of the borings.

Beneath the pavement in Borings CP-1 through CP-6 and CP-10, brown and gray silty clay with trace of sand, chert and gravel (A-6) was encountered to the termination depth of the borings. Laboratory test results indicate natural moisture contents ranged from 11.6% to 24.9%, liquid limits from 33 to 37, plasticity indices from 15 to 17 with 77.8% to 88.1% fines. SPT resistances encountered ranged from 6 to 29 blows per 300 mm suggesting medium stiff to very stiff consistencies.

Gray and brown silty sand with trace to some clay and trace gravel (A-2-4, A-4) were encountered to the termination depths of Borings CP-7 through CP-9, CP-11 and CP-12. Laboratory test results indicate natural moisture contents ranged from 13.2 to 27.5%, liquid limits from 18 to 27, plasticity indices from non-plastic to 11 with 30.8 to 59.2% fines. SPT resistances encountered ranged from weight of hammer (WOH) to 21 blows per 300 mm suggesting very loose to medium dense conditions.

Corinth-Pittsburg Landing road consists of approximately 862 RPCC slabs (431 slabs in each direction) typically 12.2 m long by 3.0 m wide. Low to high severity transverse and longitudinal cracks, corner breaks, spalling and blow outs were observed within 33% of the RPCC slabs and slab joints. The slab number and type of distress observed are listed on Table 1 in Appendix F.

#### New Entrance Road

The thickness of the asphalt surface treatment course encountered in Borings E-1 and E-2 varied from 30 to 40 mm overlaying 40 to 130 mm of aggregate base.

Beneath the pavement, brown and reddish brown clay with trace silt and sand (A-6, A-7-6) were encountered to the termination depths of the borings. Laboratory test results indicate natural moisture contents ranged from 20.1 to 21.9%, liquid limits from 40 to 48, plasticity indices from 19 to 26 and 69.4 to 84.0% fines. SPT resistances encountered ranged from 2 to 15 blows per 300 mm indicating very soft to stiff consistencies.

The pavement contains several 25 to 75 mm deep ruts and settlement.

#### McClernand Road

The AC thickness encountered in Borings MS-1 through MS-5 varied from 30 to 100 mm with an average thickness of 75 mm. No aggregate base was encountered underlying the AC.

Beneath the pavement, brown and reddish brown clay and silty clay with trace sand (A-6) was encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents ranged from 17.0% to 25.8%, liquid limits from 32 to 39, plasticity indices from 14 to 18 and 90.5% to 97.1% fines. SPT resistances encountered ranged from 2 to 22 blows per 300 mm indicating very soft to very stiff consistencies.

#### Eastern Corinth Road I (NPS Route 14)

The AC thickness encountered in Borings EC-1 through EC-3 varied from 90 to 110 mm overlaying 100 to 140 mm aggregate base.

Beneath the pavement, brown clay with some silt and trace sand (A-6, A-7-6) was encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents varied from 14.1% to 19.4%, liquid limits from 37 to 45, plasticity indices from 17 to 27 and 68.0% to 87.9% fines. SPT resistances encountered ranged from 9 to 16 blows per 300 mm indicating stiff to very stiff consistencies.

The results of the pavement condition survey for Eastern Corinth Road I are listed in Table 2.

TABLE 2 - PAVEMENT DISTRESS - EASTERN CORINTH ROAD I

Approximate Stations	Severity and Type of Pavement Distress 1)
10+000 to 10+150	L to H fatigue and longitudinal cracking, full lane
10+175 to 10+290	M to H fatigue, block and cracking, 25 to 75 mm ruts, full lane

Approximate Stations	Severity and Type of Pavement Distress 1)
10+650 to 10+670	M fatigue cracking, raveling and potholes, SB lane, full
10+685 to 10+710	H raveling and M longitudinal, full
10+820 to 10+850	L fatigue and longitudinal, full
10+950 to 10+970	L fatigue and raveling, full
11+082	H transverse cracking
11+088 to 11+095	H fatigue, full

1) L, M, H = Low, Moderate and High Severity

## Peabody Road (NPS Route 501)

The AC thickness encountered in Borings RS-1 through RS-3 and pavement cores RS-4 through RS-5 varied from 70 to 160 mm with and average thickness of 112 mm. The aggregate base thickness varied from 0 to 140 mm.

Beneath the pavement, brown silty clay and sandy clay (A-6, A-7-6) were encountered to the termination depth of all borings. Laboratory test results indicate natural moisture contents ranged from 15.2% to 22.2%, liquid limits from 29 to 41, plasticity indices from 11 to 19 and 57.9% to 95% fines. SPT resistances varied from 3 to 18 blows per 300 mm indicating soft to very stiff consistencies.

The pavement generally contains low severity fatigue cracking at a few locations.

## Hamburg-Savannah Road (NPS Route 11)

The AC thickness encountered in Borings HS-1 through HS-4 varied from 60 to 90 mm with an average thickness of 75 mm. No aggregate base was encountered.

Beneath the pavement, brown clay and silty clay with trace to some sand was encountered to the termination depth of all borings. SPT resistances varied from 3 to 34 blows per 300 mm indicating soft to hard consistencies.

The pavement generally contains low to medium severity fatigue, longitudinal and block cracking at several locations within the roadway. High severity transverse cracking was encountered between approximate stations 10+600 and 10+650 at 10 m intervals.

#### Johnston Memorial

Brown silty sand with trace chert and clay (A-4) was encountered in Boring J-1 to the termination depth of 2.74 m. Laboratory test results indicate a natural moisture content of 6.9%, liquid limit of 36, non-plastic plasticity index and 49.3% fines. SPT resistances varied

from 16 to 100<sup>+</sup> blows per 300 mm indicating very stiff to hard consistencies.

Two cores (J-2 and J-3) were retrieved from the parking area. The AC thickness encountered in these cores ranged from 70 to 90 mm with no aggregate base.

The pavement generally contains high severity fatigue and block cracking and potholes in the area surrounding the monument and near the exit from the parking area.

## Peach Orchard Parking

The AC thickness encountered in Borings PO-1 and PO-2 varied from 60 to 70 mm with no aggregate base.

Beneath the pavement, brown clay with some silt and trace sand (A-6) was encountered to the termination depth of both borings. Laboratory test results indicate natural moisture contents ranged from 18.9% to 22.9%, a liquid limit of 37, a plasticity index of 18 with 92.8% fines.

### Bloody Pond Tour Stop

The AC thickness encountered in Borings BP-1 and BP-2 varied from 60 to 90 mm with no aggregate base.

Beneath the pavement in Boring BP-1, reddish brown silt with trace clay and sand (A-4) was encountered to the termination depth of 2.1 m. Laboratory test results indicate a natural moisture content of 20.4%, a liquid limit of 31, non-plastic plasticity index and 88.4% fines. SPT resistances ranged from 7 to 22 blows per 300 mm indicating stiff to very stiff consistencies.

Beneath the pavement in Boring BP-2, brown sandy clay with trace silt (A-6) was encountered to the termination depth of the boring. Laboratory test results indicate a natural moisture content of 15.7%, a liquid limit of 32, a plasticity index of 13 and 69.1% fines. SPT resistances ranged from 9 to 18 blows per 300 mm indicating stiff to very stiff consistencies.

#### Groundwater

No groundwater was encountered during or after completion of drilling in any of the borings. Fluctuations in the groundwater level due to seasonal and climatic effects should be expected.

## ANALYSIS AND CONCLUSIONS

#### **Pavements**

Flexible pavement design analyses were conducted for overlay, reconstruction and new construction areas using the 1997 AASHTO Pavement Design, DARWin(tm) Pavement Design

System (version 3.01). DARWin was used to determine the future structural number (SN) for each pavement section. Flexible pavement design analyses were conducted for a 20-year design period. The design analyses to determine the 80-kN equivalent single axle loads (ESAL's) were performed using the Rigorous ESAL Calculation in DARWin and were based upon traffic count and vehicle classification data obtained from the Design Scoping Report. Initial Average Daily Traffic (ADT) values were estimated from the reported 1995 ADT values by figuring a 2 percent annual growth from 1995. The effective roadbed soil resilient modulus was determined from the CBR tests that were correlated to the resilient modulus (M<sub>R</sub>). Resilient moduli used for the analysis were 62055 and 72398 kPa, which correspond to CBR's of 6 and 7, respectively. Other parameters specified in the analyses include a reliability of 85 percent, and overall standard deviation of 0.49, an initial serviceability index of 4.2, and a terminal serviceability index of 2.2. The results of the pavement design analysis are presented in Appendix G.

For constructibility reasons, analyses of new pavement sections and reconstruction areas considered a minimum section consisting of 40 mm of SACP surface course (12.5 mm NMSA); 60mm of SACP base course (19 mm NMSA) and 200mm of aggregate base (grading C or D). Also, for constructability reasons, analyses of overlay sections considered a minimum course of 40 mm SACP (12.5 mm NMSA).

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## Structural plate-arch pipe Foundations

The foundations for the proposed structural place pipe-arch on Reconnoitering road were analyzed. Bearing capacity analysis was performed for spread footings based on assumed footing widths of 1.5, 2.0 and 2.5 m and a length of 2.5 m. Allowable bearing capacity calculations were performed using methods from AASHTO Standards for design of Highway Bridges (AASHTO, 1996) and Foundation Analysis and Design, Bowles, 1996. Calculations were performed assuming a 0.76 m overburden below the stream bed. Results for no overburden are also presented in the recommendations section. The results of the spread footings analysis are presented in Tables 3 and 4. Bearing capacity calculations are presented in Appendix D. Calculated total settlements for the spread footings at the allowable loads are expected to be 15, 20 and 25 mm, respectively. No scour data was available at the time of writing this report. Once scour data is provided, these foundation recommendations will be verified or revised as required.

TABLE 3 - ALLOWABLE BEARING CAPACITY RESULTS ASSUMING 0.76 m OVERBURDEN

Footing Dimensions (m)	Ultimate Bearing Capacity (KPa)	Factor of Safety	Allowable Bearing Capacity (KPa)
6.5 x 1.5	426	3	142
6.5 x 2.0	495 -	3	165
6.5 x 2.5	537	3	179

TABLE 4 - ALLOWABLE BEARING CAPACITY RESULTS ASSUMING NO OVERBURDEN

Footing Dimensions (m)	Ultimate Bearing Capacity (KPa)	Factor of Safety	Allowable Bearing Capacity (KPa)
6.5 x 1.5	183	3	61
6.5 x 2.0	249	3	83
6.5 x 2.5	300	3	100

#### RECOMMENDATIONS

#### **Pavements**

The following pavement recommendations are based on the pavement condition survey performed during August 1999, subsurface exploration and laboratory test results and analysis.

General - The recommended general procedure for rehabilitation of the roadways, turnarounds and parking areas consists of full-depth spot reconstruction followed by an SACP overlay. It is recommended to place 0.75 m wide strips of paving geogird over existing low to high severity fatigue, longitudinal and transverse cracks prior to placing the overlay.

It is recommended the pavement reconstruction and new construction areas to consist of 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D). The recommended SACP surface and base courses mix designs for the project are 12.5 mm nominal maximum size aggregate (NMSA), <0.3 x 10<sup>6</sup> EASL's and 19 mm NMSA, <0.3 x 10<sup>6</sup> EASL's; respectively.

Recommendations for each specific site are presented below.

#### Brown's Landing Road (NPS Route 502)

It is recommended to overlay Brown's Landing road using 50 mm SACP overlay (12.5 mm NMSA). It is recommended to use the above described pavement section for widening of the road.

## Pittsburg Landing Road I (NPS Route 13)

It is recommended to overlay Pittsburg Landing I road using 50 mm SACP overlay. It is recommend to construct the realigned section of Pittsburg Landing road I using 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D).

## Visitor Center and Cemetery Parking Areas

It is recommended to overlay the Visitor Center and Parking area using 50 mm SACP overlay. Pavement reconstruction areas within the parking lot are recommended to consist of 40 mm of SACP surface course, 60 mm of SACP base course and 200 mm aggregate base (grading C or D).

## Pittsburg Landing Road II

It is recommended to overlay Pittsburg Landing II road using 50 mm SACP overlay.

## Reconnoitering Road (NPS Route 500)

It is recommended to overlay Reconnoitering road using 50 mm SACP overlay.

## Corinth-Pittsburg Landing Road (NPS Route 12)

Based on the pavement condition survey and scoping report, RPCC slab replacement and joint repair are the recommended rehabilitation procedures. Approximately 33% of the RPCC slabs will require replacement. It is recommended to clean and seal all longitudinal and transverse joints. A list of the slab numbers, type of defects and recommended replacement or joint repair is presented in Table 1 in Appendix F.

#### Entrance Road

Based on the pavement condition survey, it is recommended to place an SACP wedge and level course prior to placement of the AC overlay for the existing portion of the Entrance road that is to remain in use. The overlay is recommended to consist of 65 mm SACP overlay (12.5 mm NMSA).

Based on the information provided by Project Development, the new Entrance road will be realigned. It is recommended to construct the new roadway alignment using the minimum recommended pavement section described previously.

#### McClernand Road

It is recommended to overlay McClernand road using 65 mm SACP overlay (12.5 mm NMSA).

## Eastern Corinth road I (NPS Route 14)

It is recommended to overlay Eastern Corinth road I using 50 mm SACP overlay (12.5 mm NMSA). Prior to placement of the SACP overlay, perform spot reconstruction or place a paving geogrid at the locations shown in Table 5.

TABLE 5 - SPOT RECONSTRUCTION AND PAVING GEOGRID RECOMMENDATIONS

Approximate Stations	Lane Width	Reconstruction Type	
10+000 to 10+150	Both lanes, full	Full-depth spot reconstruction	
10+175 to 10+290	Both lanes, full	Full-depth spot reconstruction, part of the realignment	
10+650 to 10+670	SB lane, full	Full-depth spot reconstruction	
10+685 to 10+710	Both lanes, full	Paving geogrid	
10+820 to 10+850	Both lanes, full	Paving geogrid	
11+082	Both lanes, full	Paving geogrid	
11+088 to 11+095	Both lanes, full	Full-depth spot reconstruction	

## Peabody Road (NPS Route 501)

It is recommended to overlay Peabody road using 50 mm SACP overlay (12.5 mm NMSA).

## Hamburg-Savannah Road (NPS Route 11)

It is recommended to overlay Hamburg-Savannah road using 70 mm overlay (12.5 mm NMSA). Prior to placement of the overlay full-depth spot reconstruction should be performed in the area between stations 10+780 and 10+900. It is recommended to place paving geogird on the transverse cracks between stations 10+600 and 10+650.

#### New One-way Loop Around Tent Hospital Site

It is recommended to construct the new one-way loop using 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base (grading C or D).

#### Johnston Memorial

Based on the pavement condition survey, it is recommended to perform full-depth spot reconstruction in the area around the memorial at the locations shown on the drawing in Appendix B. Full-depth spot reconstruction is recommended to consist of 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base course (grading C or D).

## Peach Orchard Parking

For widening of Peach Orchard Parking area, it is recommended to use the minimum recommended pavement section consisting of 40 mm SACP surface course, 60 mm SACP

base course and 200 mm aggregate base course.

## **Bloody Pond Tour Stop**

It is recommended to use 40 mm SACP surface course, 60 mm SACP base course and 200 mm aggregate base course for reconstruction of the roadway and 2 turnouts at Bloody Pond Tour Stop.

## Foundations - Structural plate-arch pipe

It is recommended to support the new structural plate pipe-arch on Reconnoitering road on spread footings founded on competent soils. Allowable bearing capacities for footing widths of 1.5, 2.0 and 2.5 m are 142, 165 and 179 KPa, respectively, assuming 0.76 m of overburden. Allowable bearing capacities were also calculated assuming no overburden for footing widths of 1.5, 2.0 and 2.5 m as 61, 83 and 100 KPa, respectively. Total settlements are estimated at 15, 20 and 25 mm based on allowable bearing pressures of 142, 165 and 179 KPa, respectively. Differential settlements are expected to be approximately half of the total settlement values.

#### Culverts

Metal pipe culvert service life can be estimated based on a pH of 4.5 and a minimum electrical resistivity of 10,000 ohm-cm.

#### Construction Considerations

The majority of the subgrade soils at the project site are moderate to high plasticity clay. Some subexcavation and replacement with unclassified borrow (or better) is anticipated in spot reconstruction and new construction areas. It is recommended to include a quantity of 250 cubic meter of subexcavation and replacement in the contract.

#### DISCLAIMER/LIMITATIONS CLAUSE

The subsurface explorations and tests described in the section on Procedures and Results have been conducted in accordance with standard practices and procedures (except as specifically noted). The results of these explorations and tests represent conditions at the specific locations indicated. Subsurface conditions between these locations may vary. The Analysis and Conclusions sections and the Recommendations section in this report include interpretations and recommendations developed by the Government in the process of preparing the design. These interpretations are not intended as a substitute for the personal investigation, independent interpretation, and judgment of the Contractor.

Prepared by:

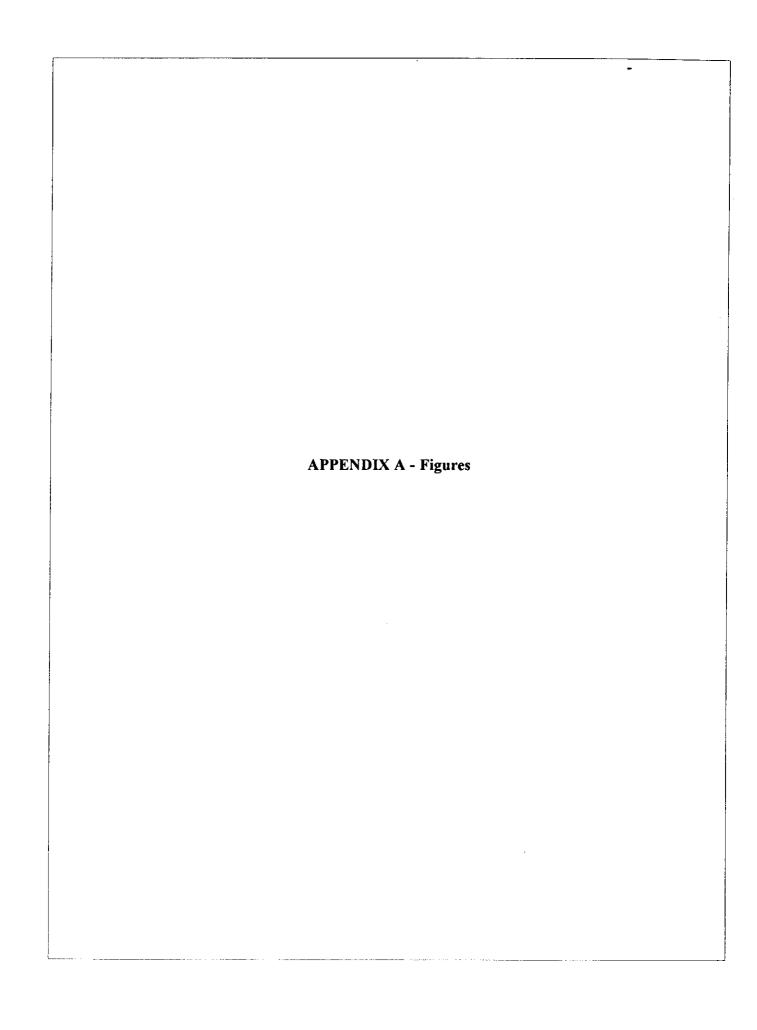
Khalid T. Mohamed

Geotechnical and Pavement Engineer

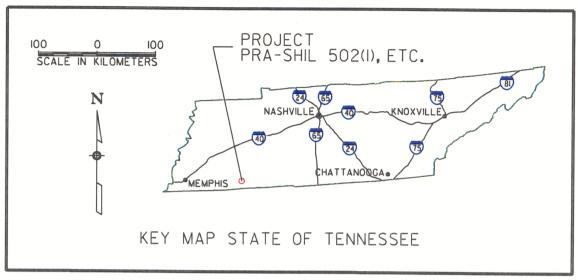
Reviewed by:

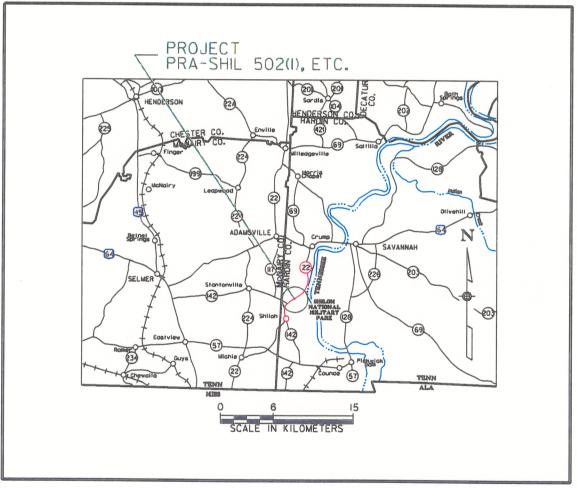
William Bassett, P.E.

Supervisory Geotechnical Engineer



REG	STATE	PROJECT	TOTAL SHEETS
SE	TENN	PRA-SHIL 502(I), ETC.	





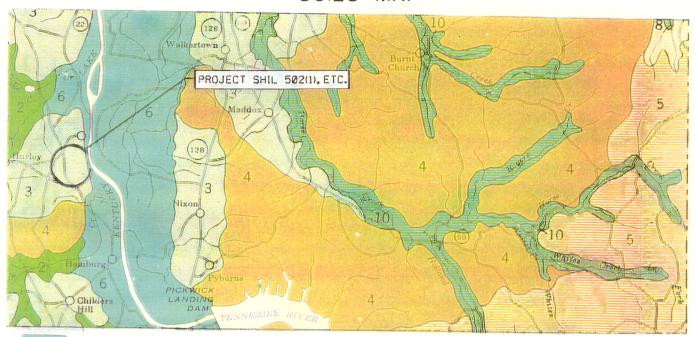
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

LOCATION MAP FIGURE 1

GEOTECHNICAL REPORT 24-99

REG	STATE	PROJECT	SHEET NO.	TOTAL SHEETS
SE	TNN	PRA-SHIL 502(I), ETC.		

## SOILS MAP



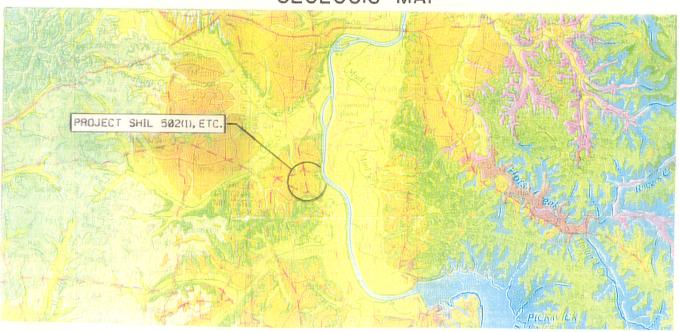
WOLFTEVER-BEASON-EGAM ASSOCIATION

NEARLY LEVEL SOILS ON LOW STREAM TERRACES AND FLOOD PLAINS OF THE TENNESSEE RIVER

PADEN-PICKWICK-WAYNESBORO ASSOCIATION

MODERATELY WELL DRAINED SOILS AND WELL DRAINED SOILS ON HIGH TERRACES

# GEOLOGIC MAP



HIGH-LEVEL ALLUVIAL DEPOSITS
IRON-STAINED GRAVEL, SAND, SILT, AND CLAY, VARIABLE IN THICKNESS BUT GENERALLY
LESS THAN 60 FEET THICK.

ALLUVIAL DEPOSITS

SAND, SILT, CLAY, AND GRAVEL; GENERALLY LESS THAN 20 FEET THICK.

EUTAW FORMATION

CHAYISH-GREEN SAND, FINE-GRAINED, GLAUCONITIC, MICACEDUS; INTERBEDDED WITH GRAY LAMINATED CLAYS WHICH COMMONLY CONTAIN CARBONIZED OR SILICIFIED WOOD, THICKNESS @ TO 18@ FEET; THINS NORTHWARD.

COFFEE SAND

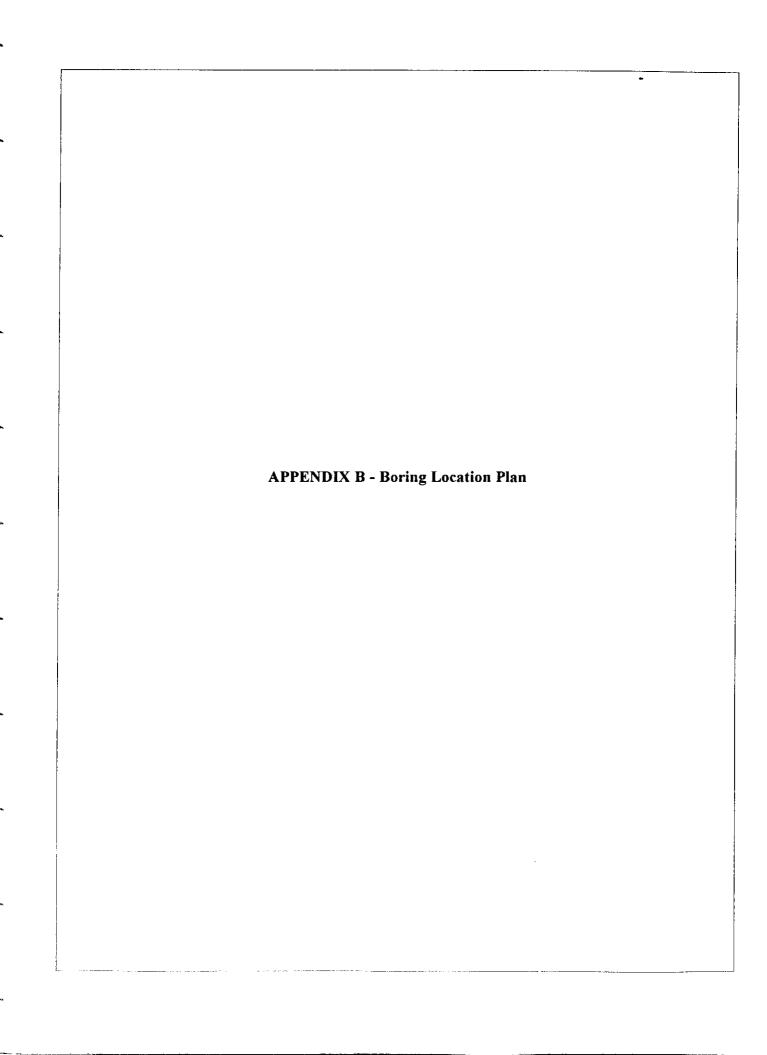
LOOSE, FINE-GRAINED SAND, LIGHT-GRAY, SPARSELY GLAUCONITIC, LOCALLY INTERBEDDED WITH LAMINATED LIGNITIC CLAY. THICKNESS 25 TO 200 FEET; THINS NORTHWARD.

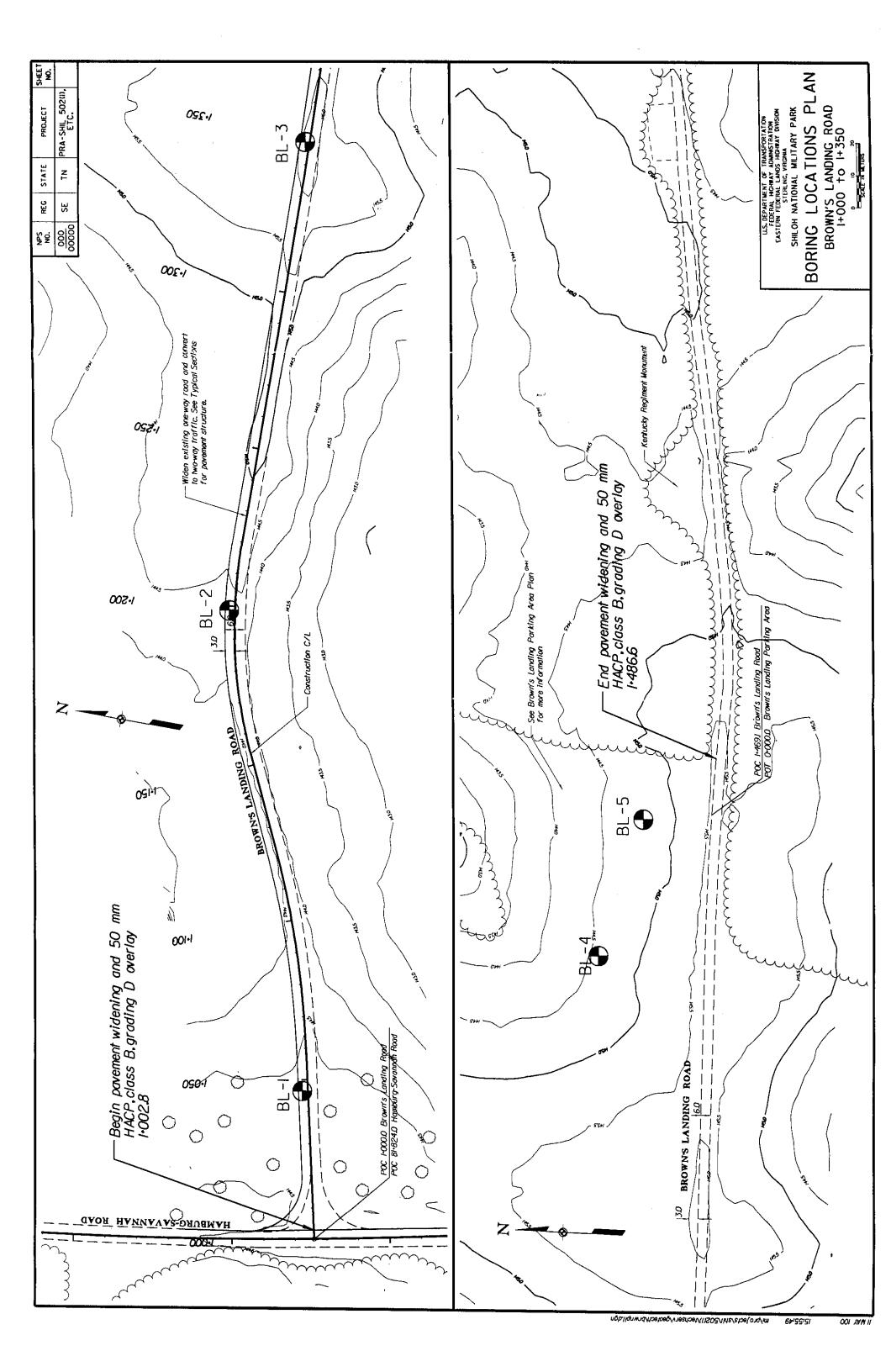
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION
STERLING, VIRGINIA

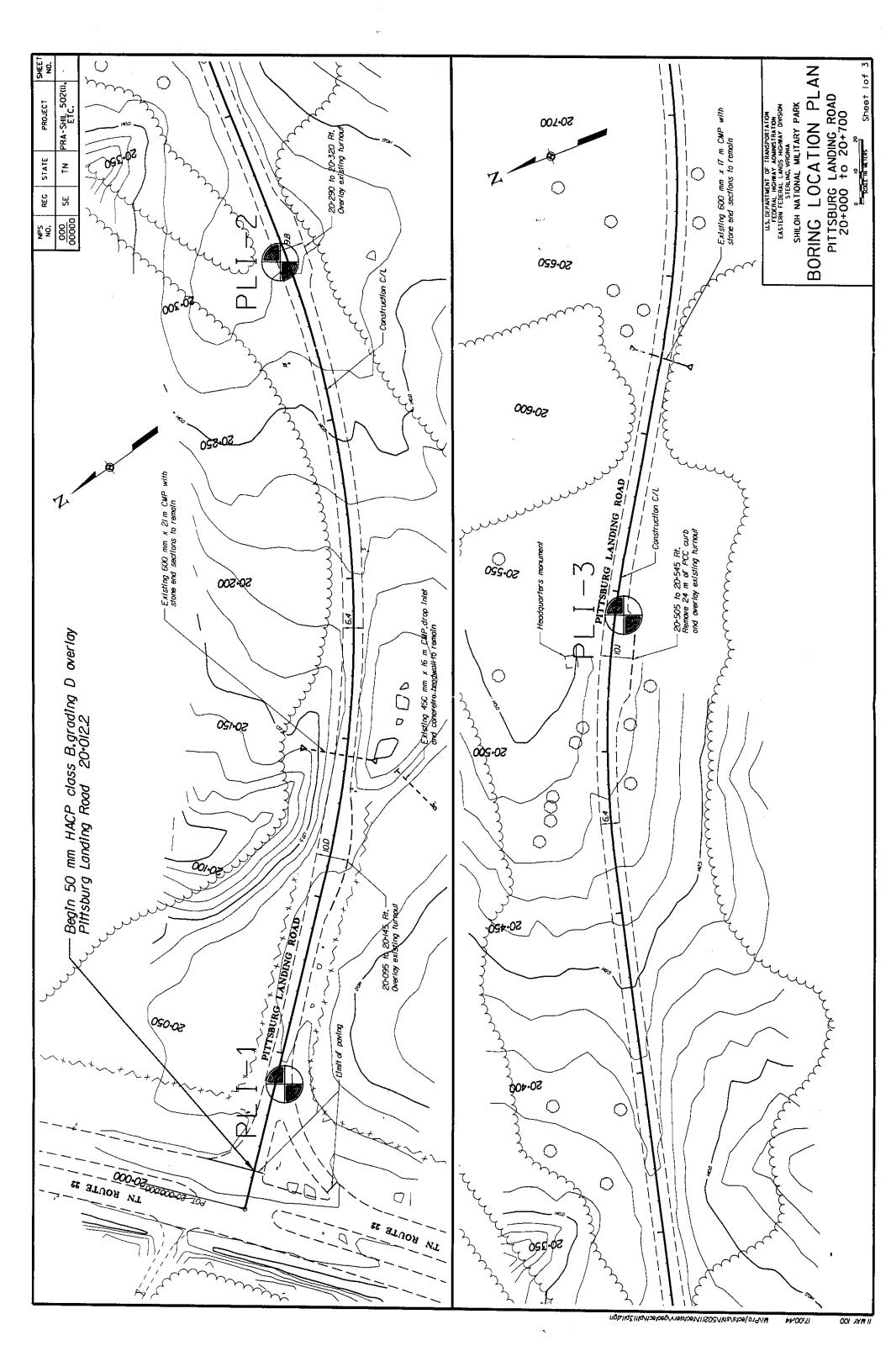
GEOLOGY MAPS

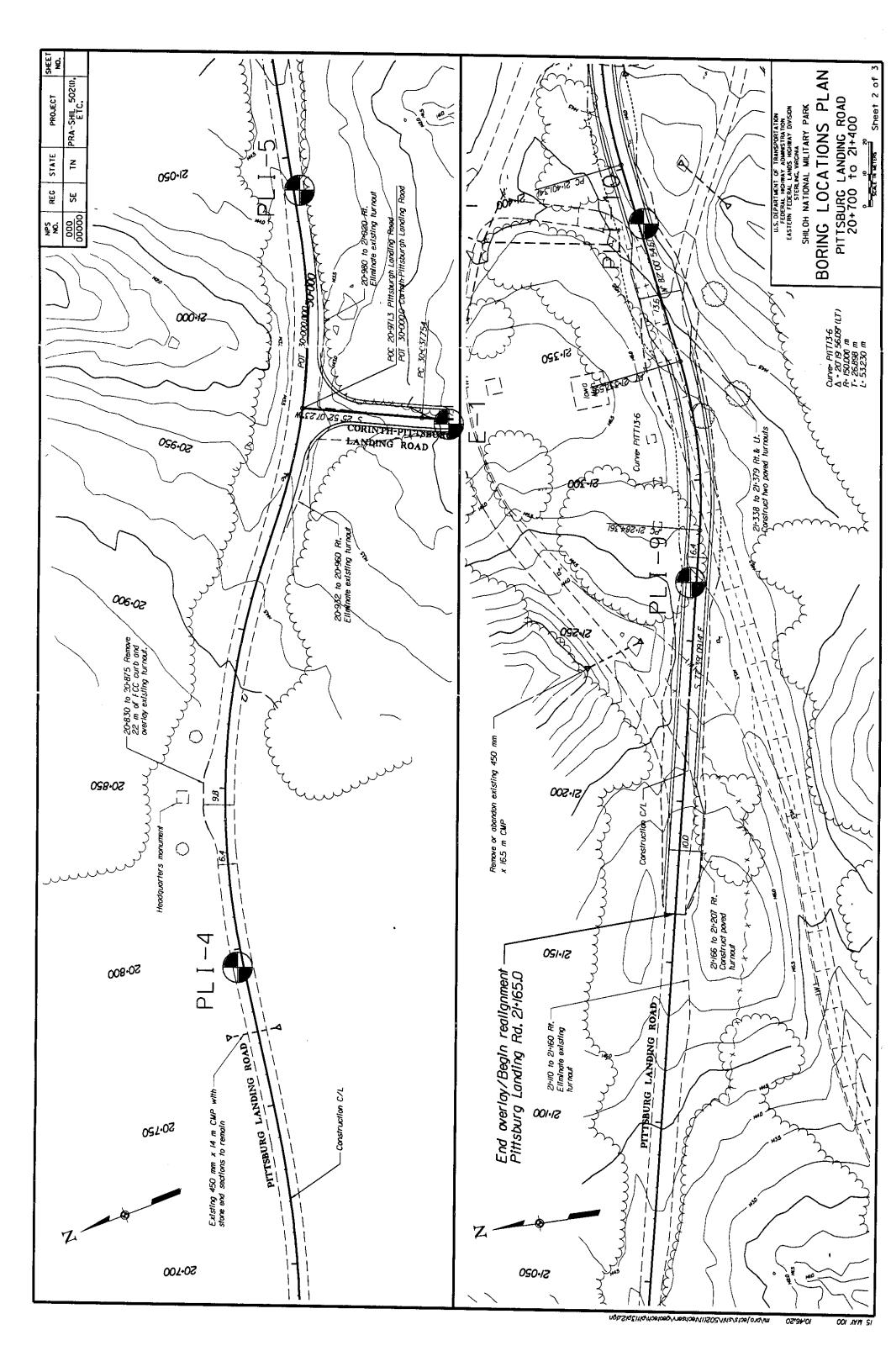
FIGURE 3

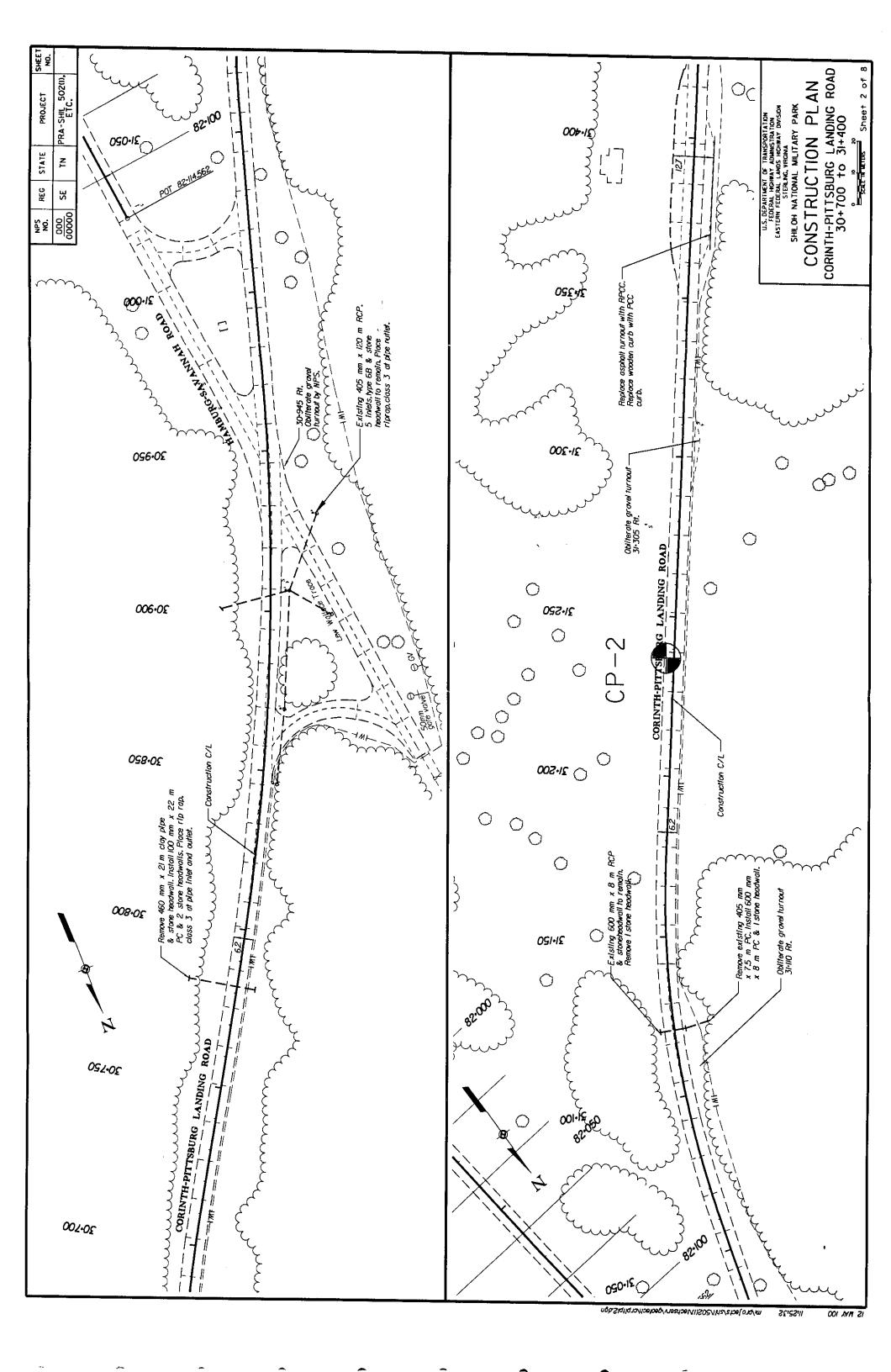
GEOTECHNICAL REPORT 24-99

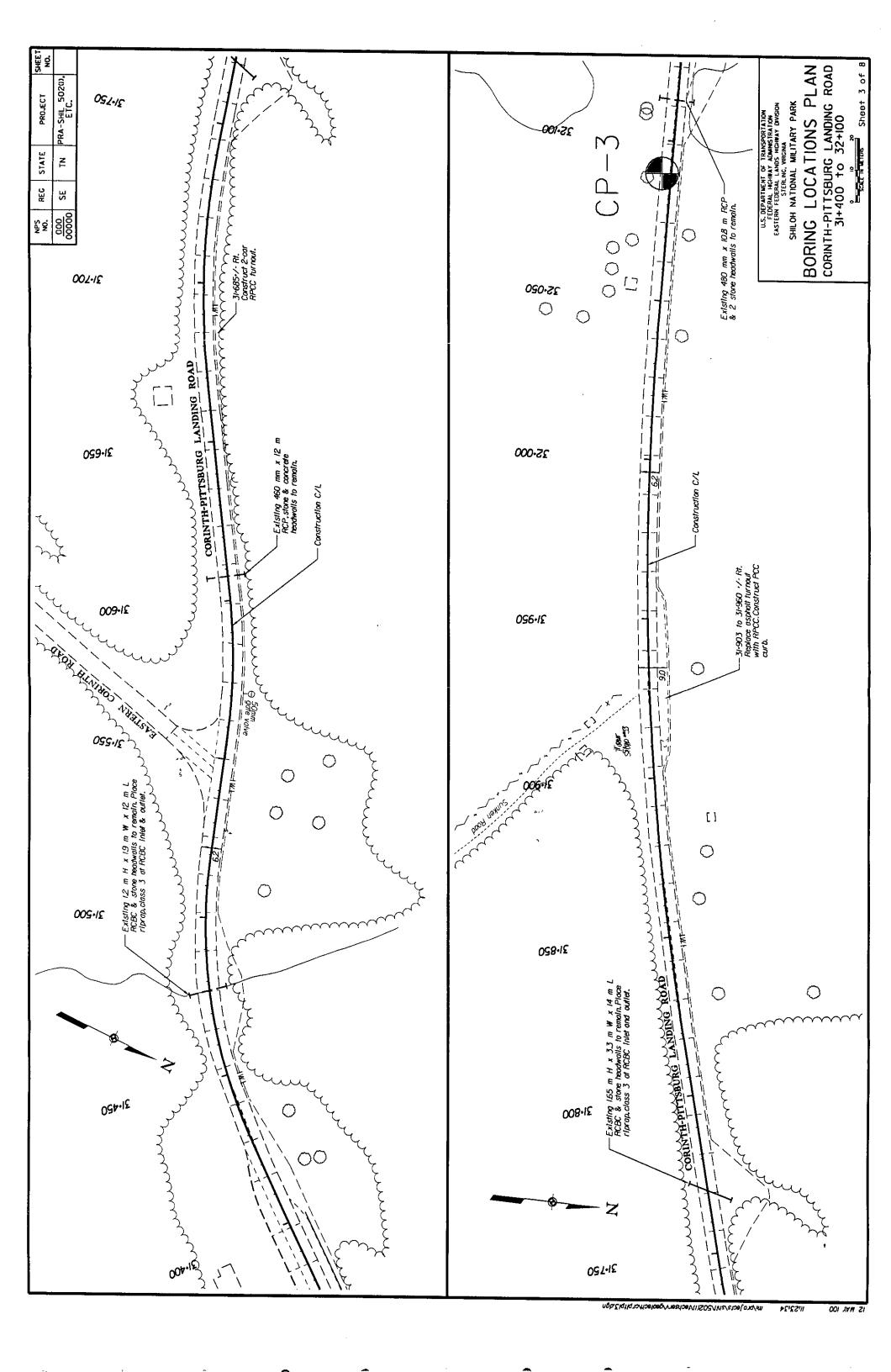


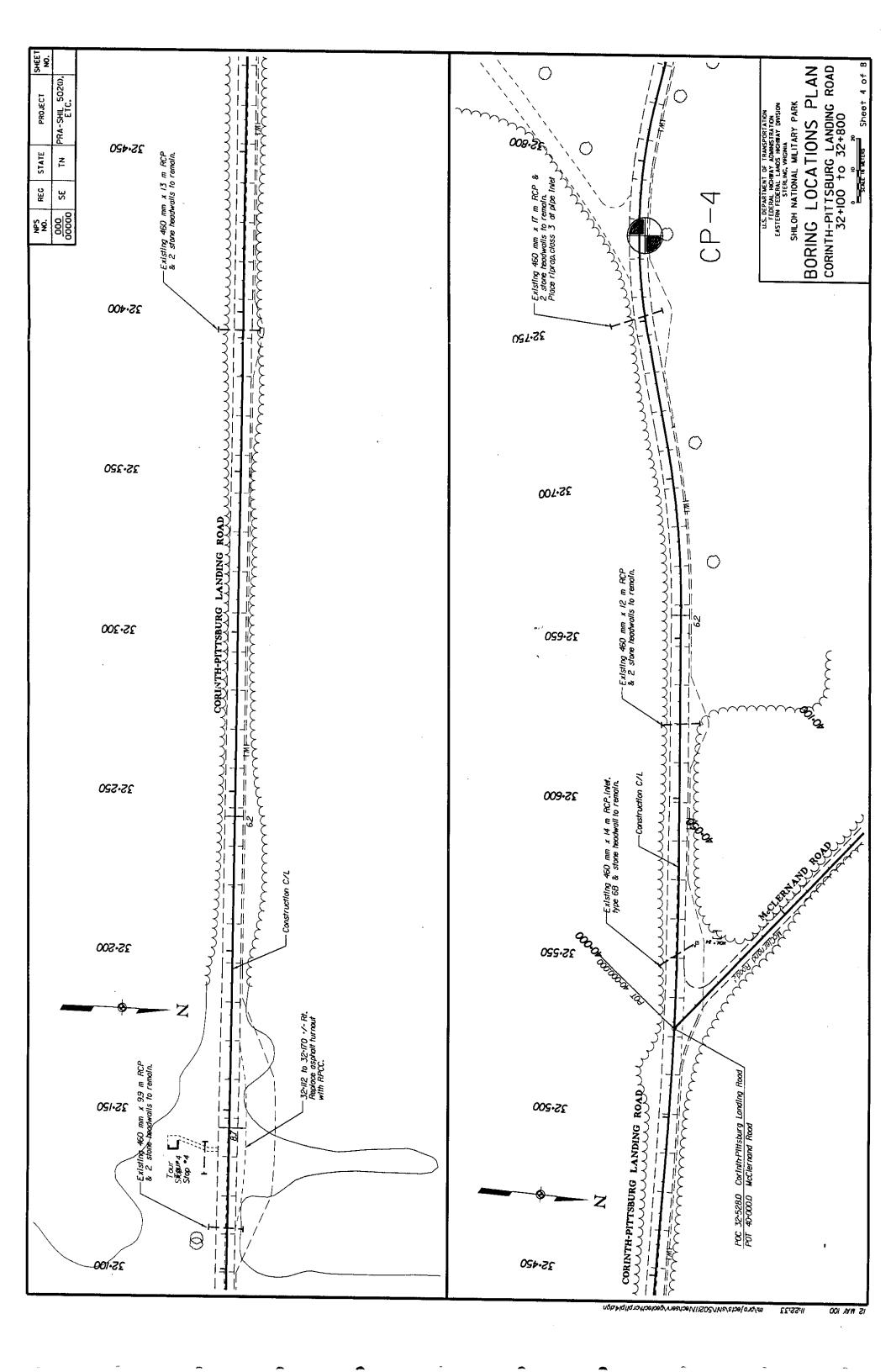


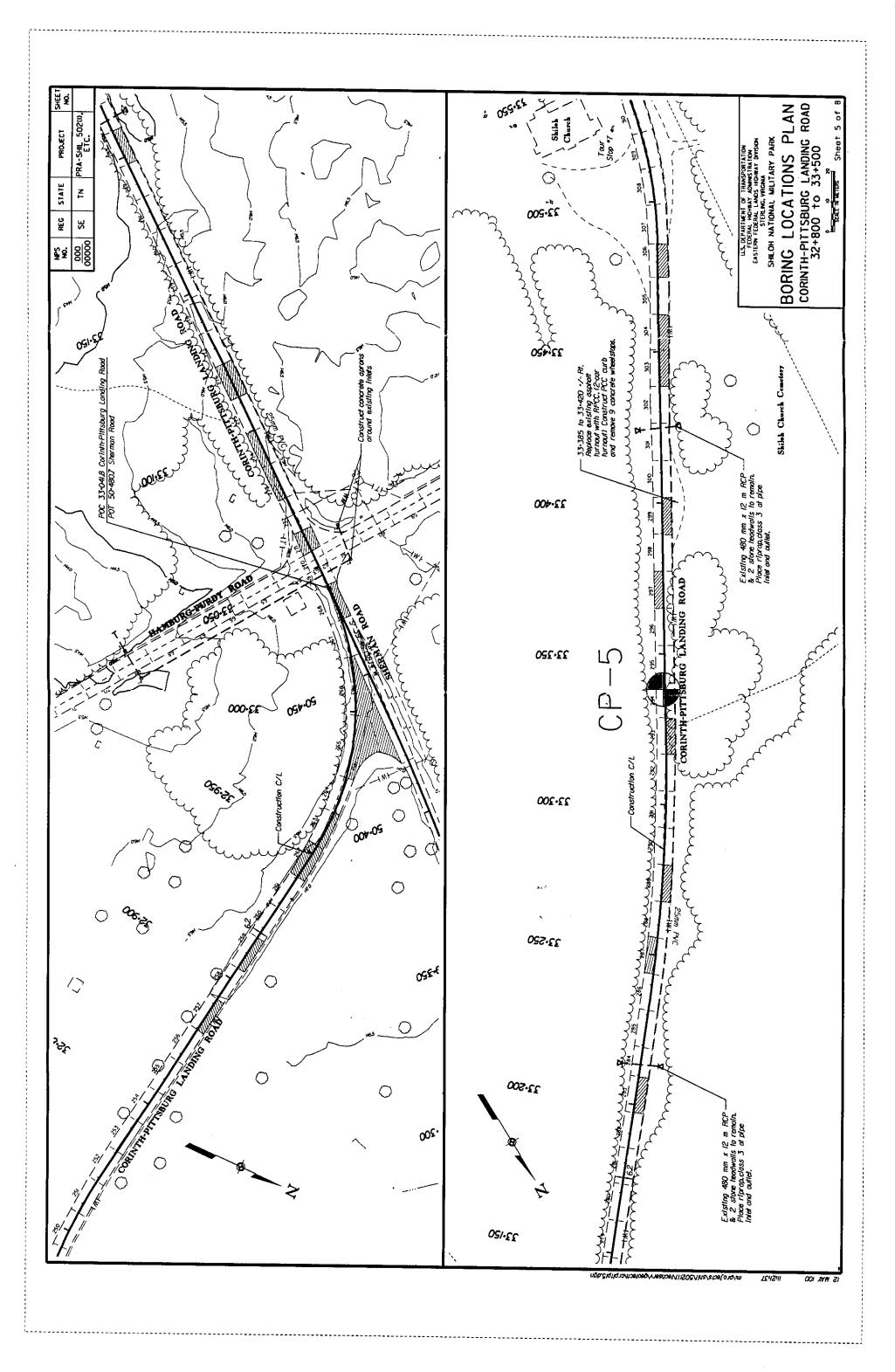


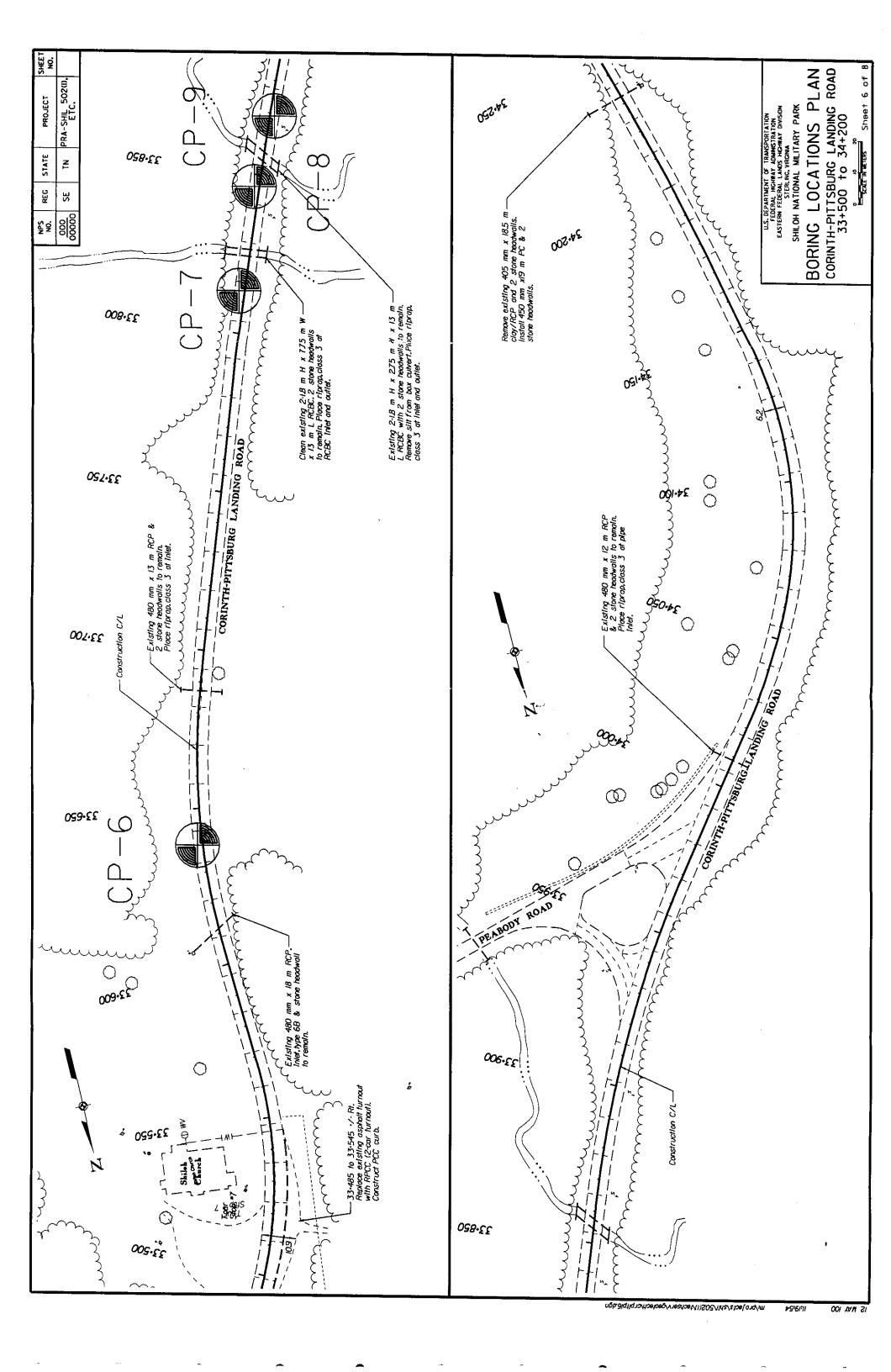


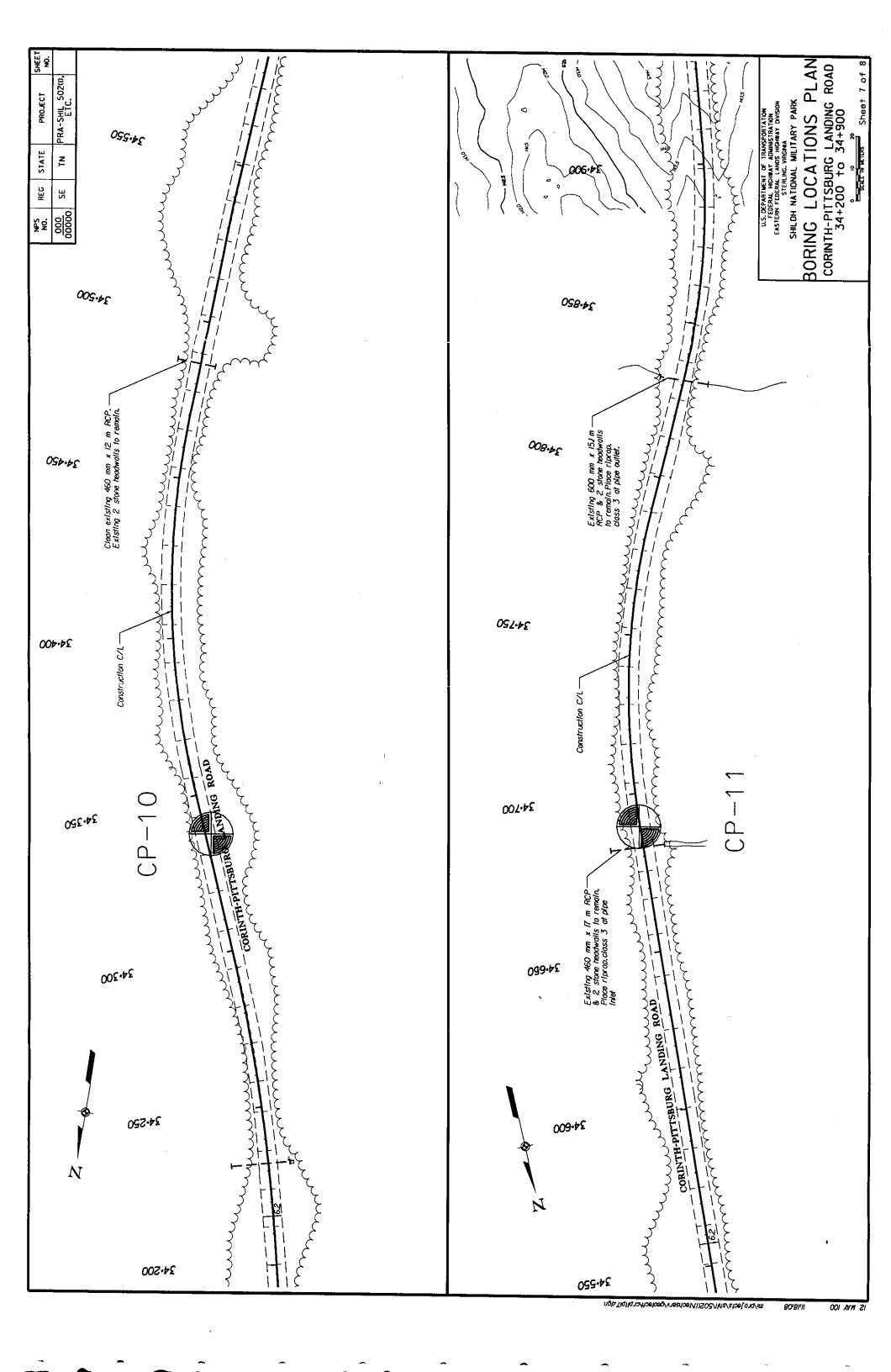


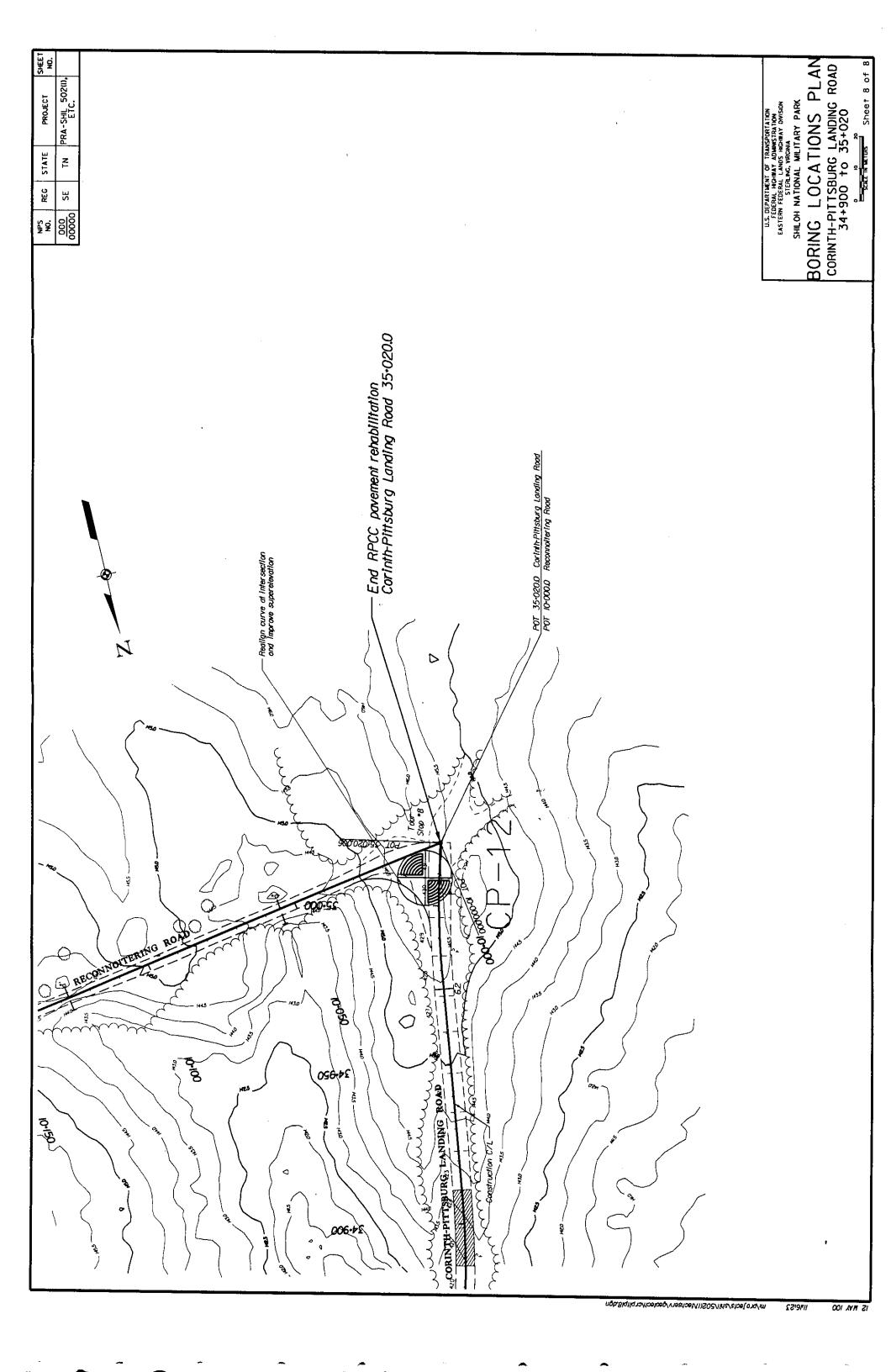


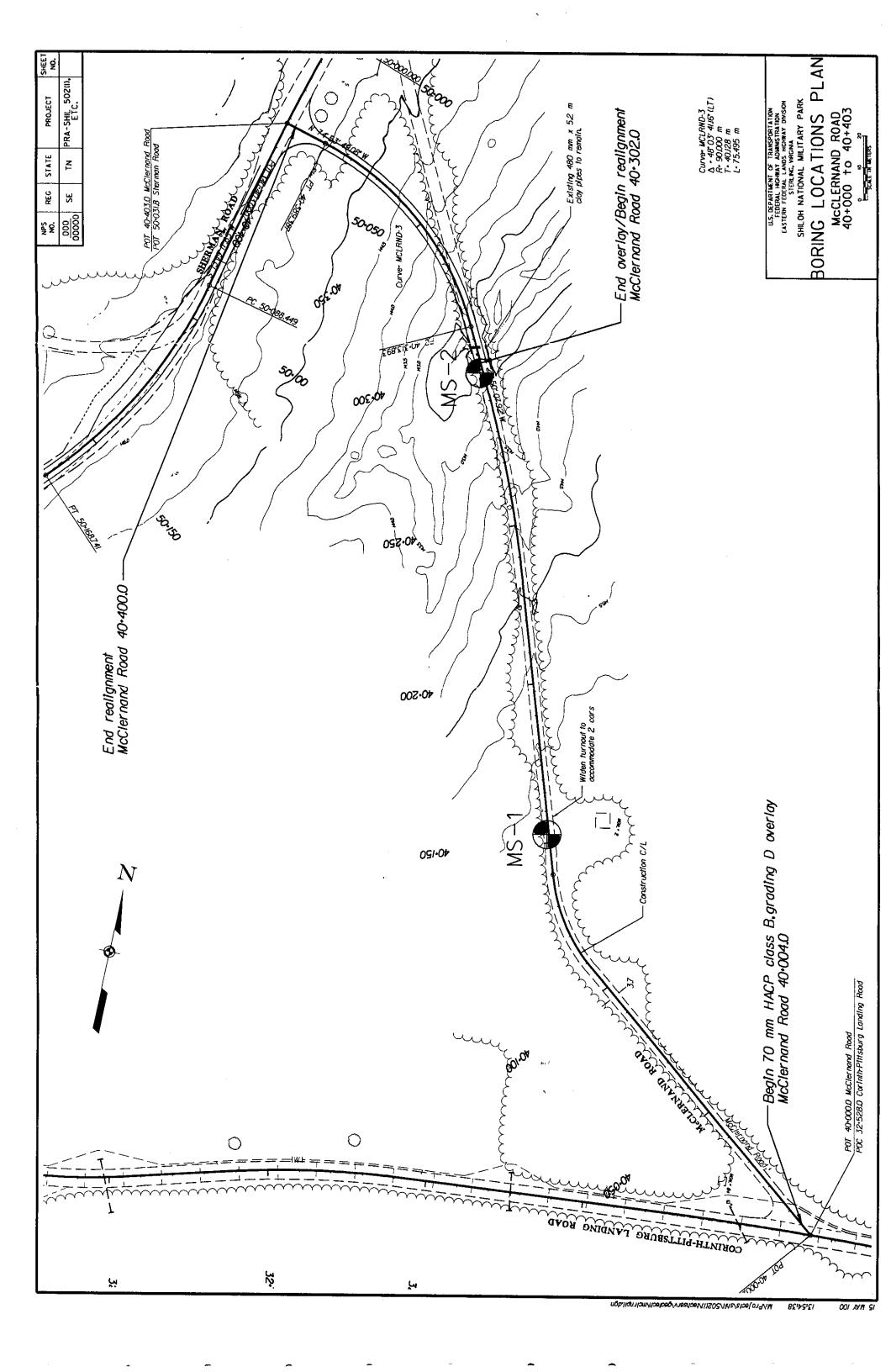


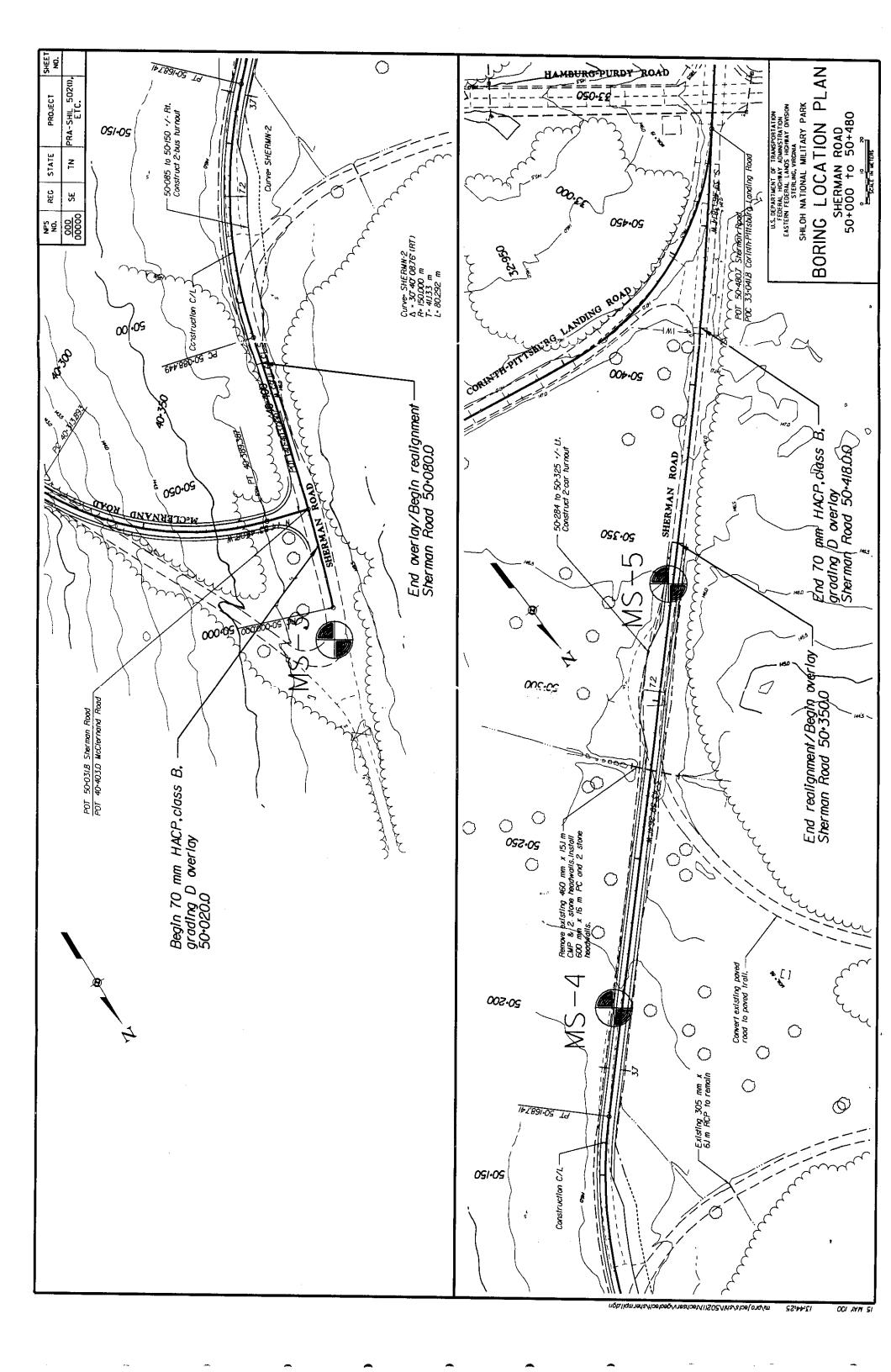


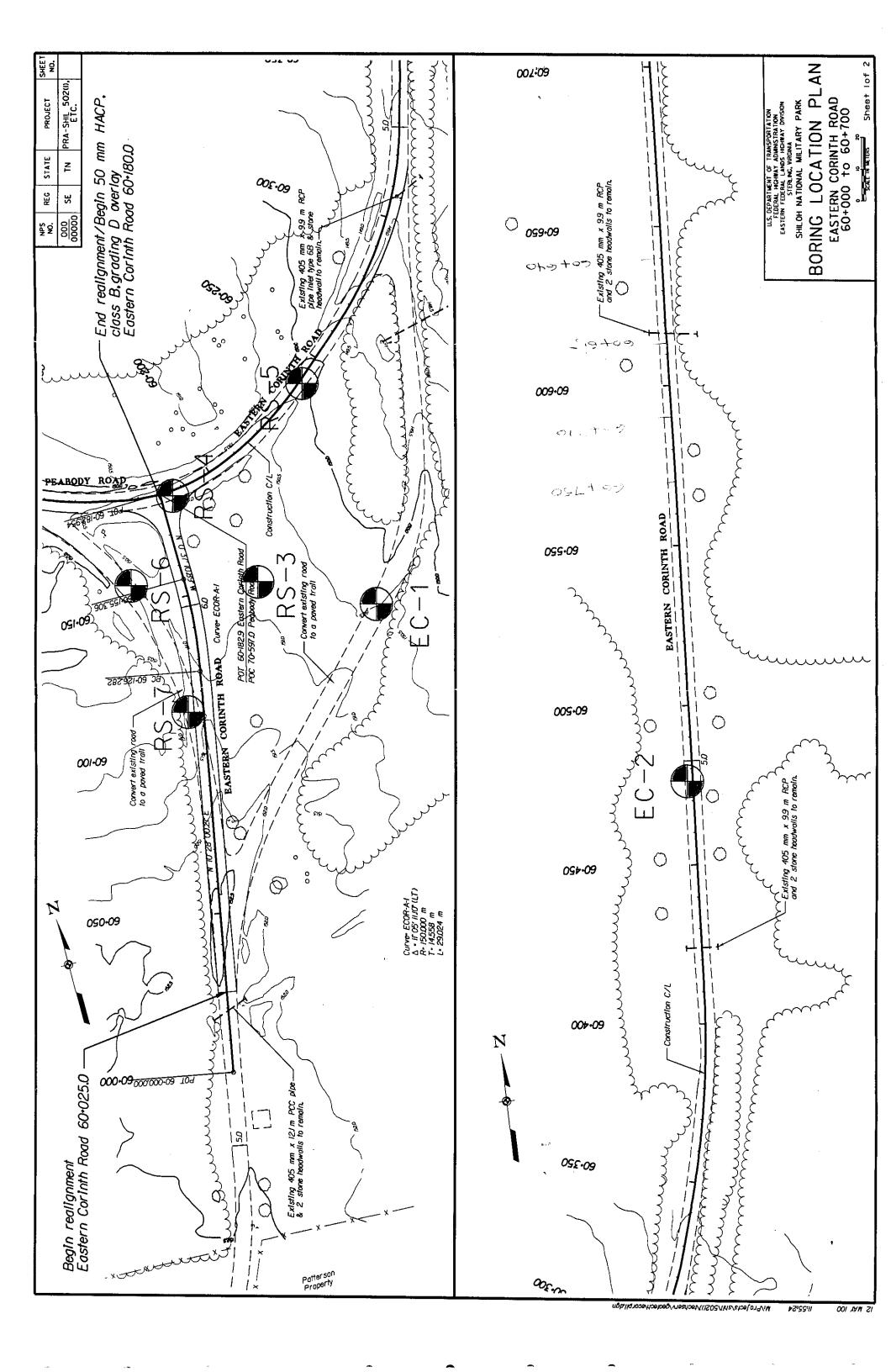


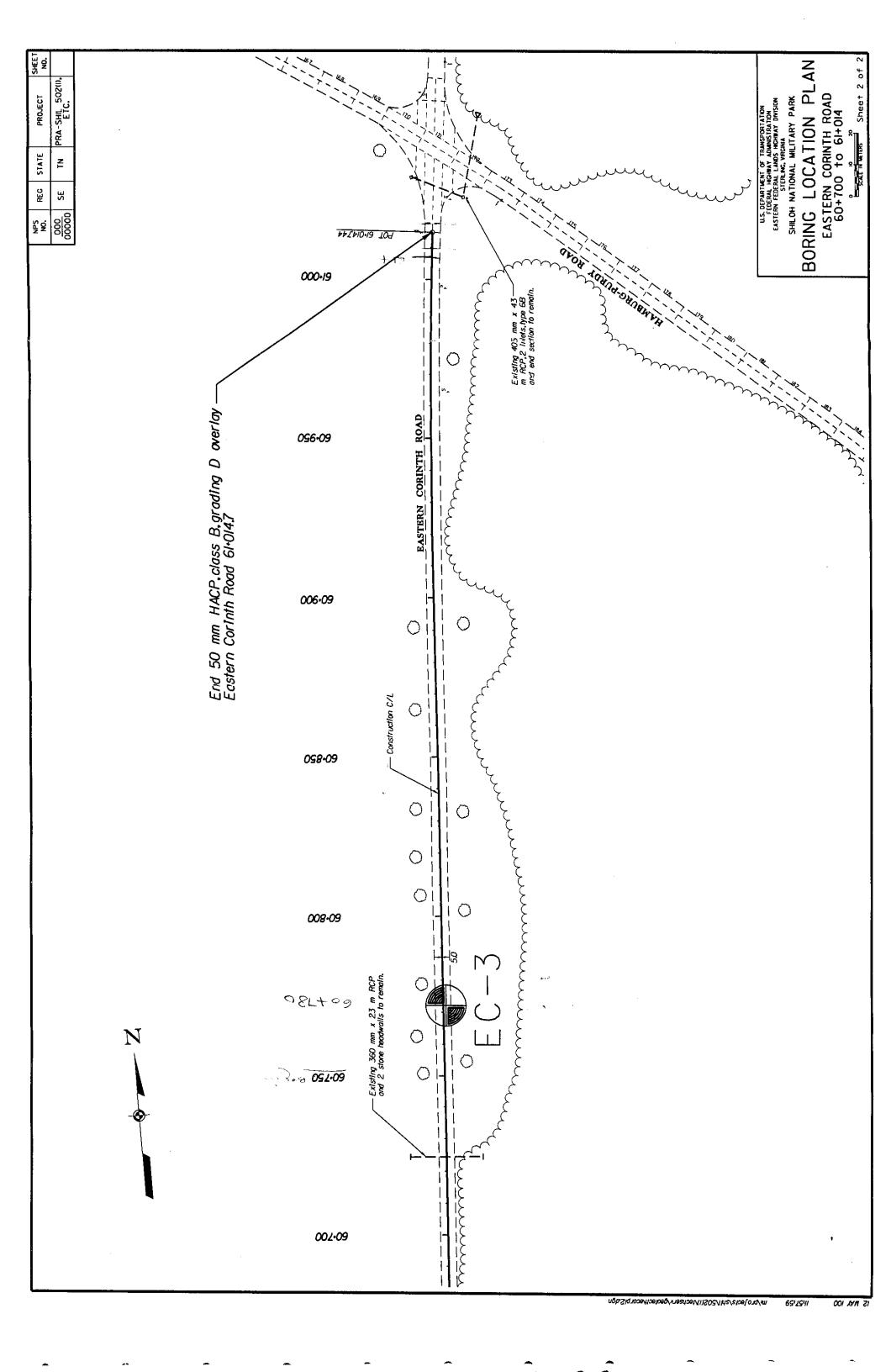


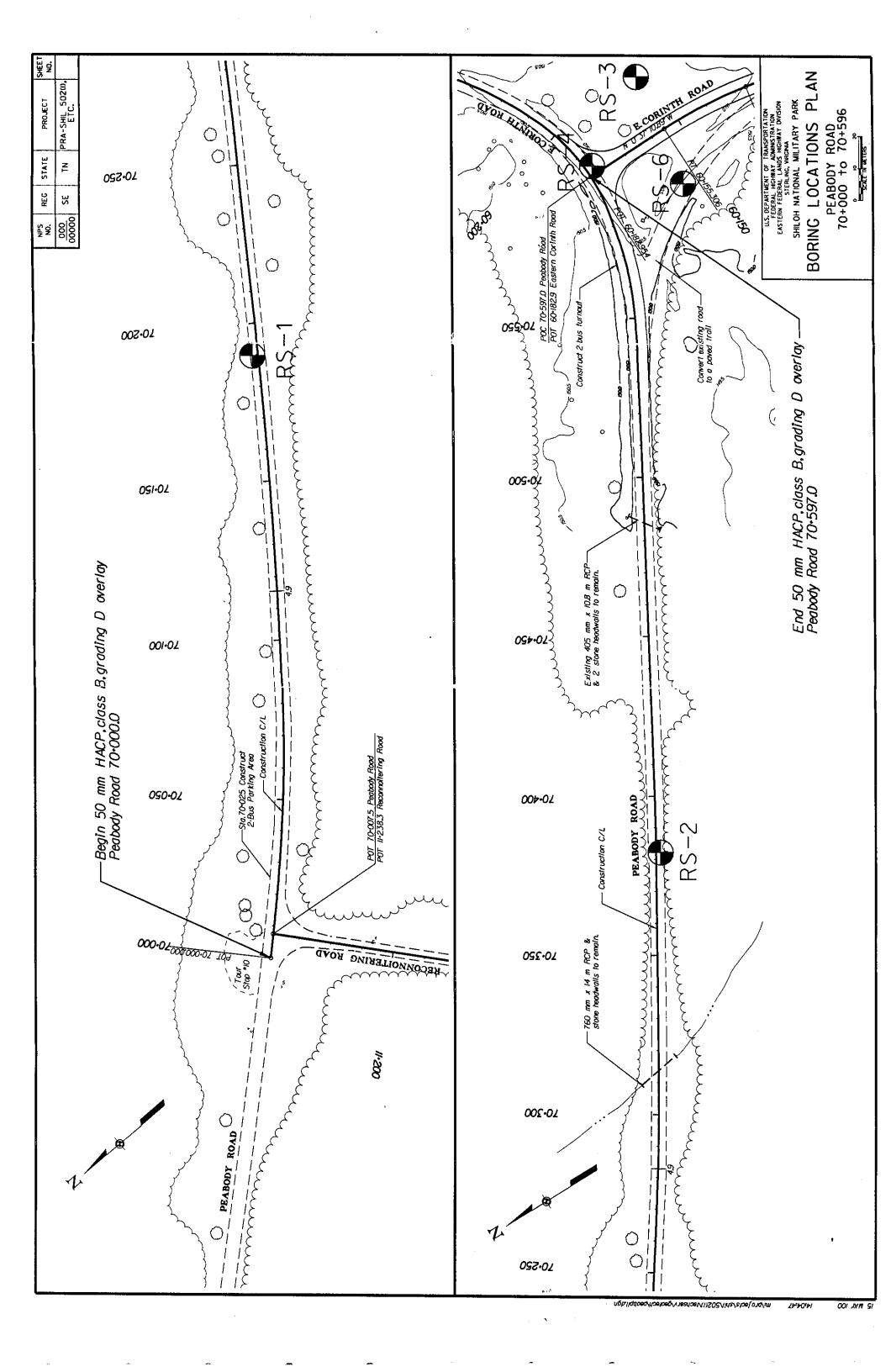


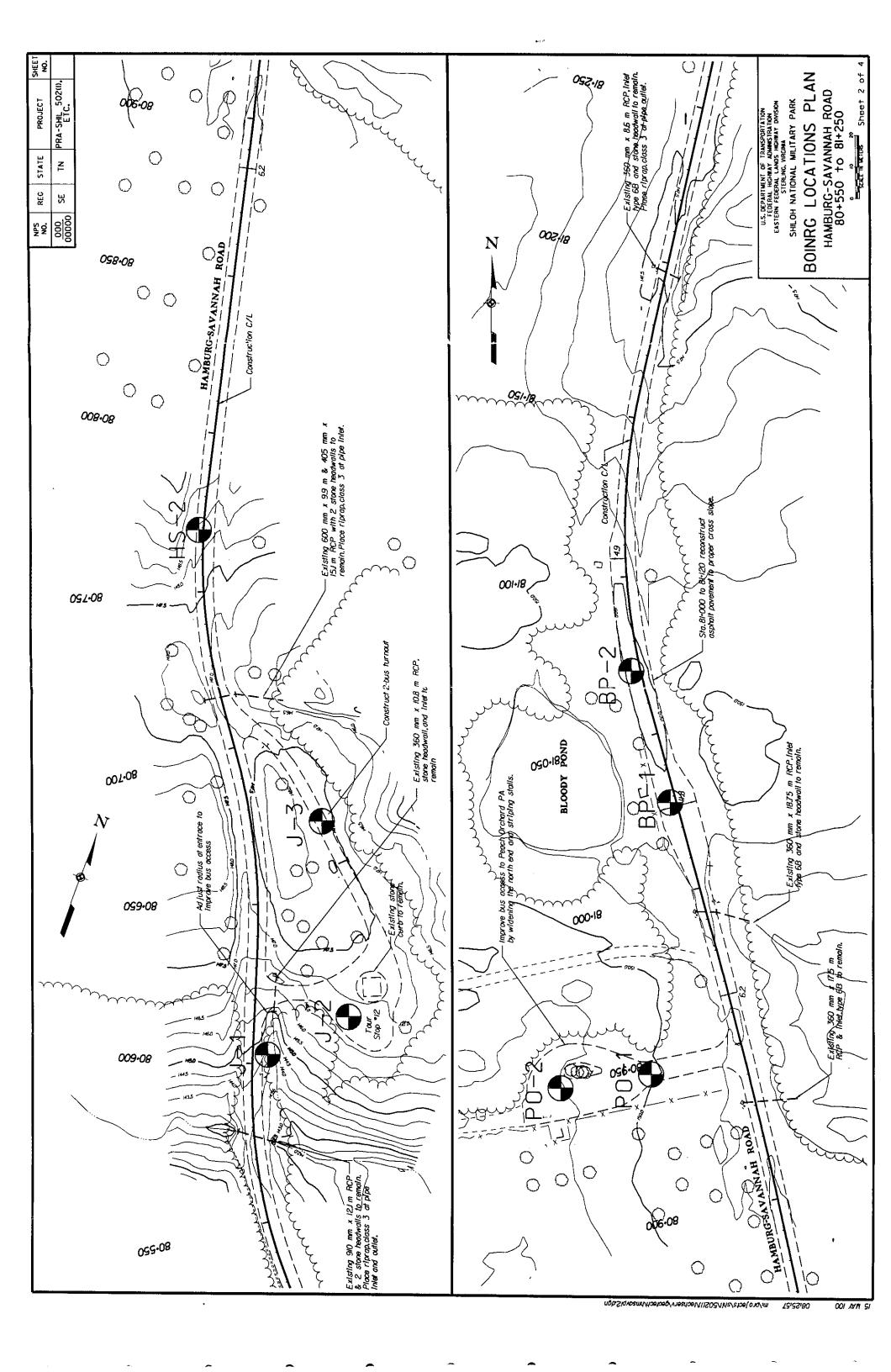


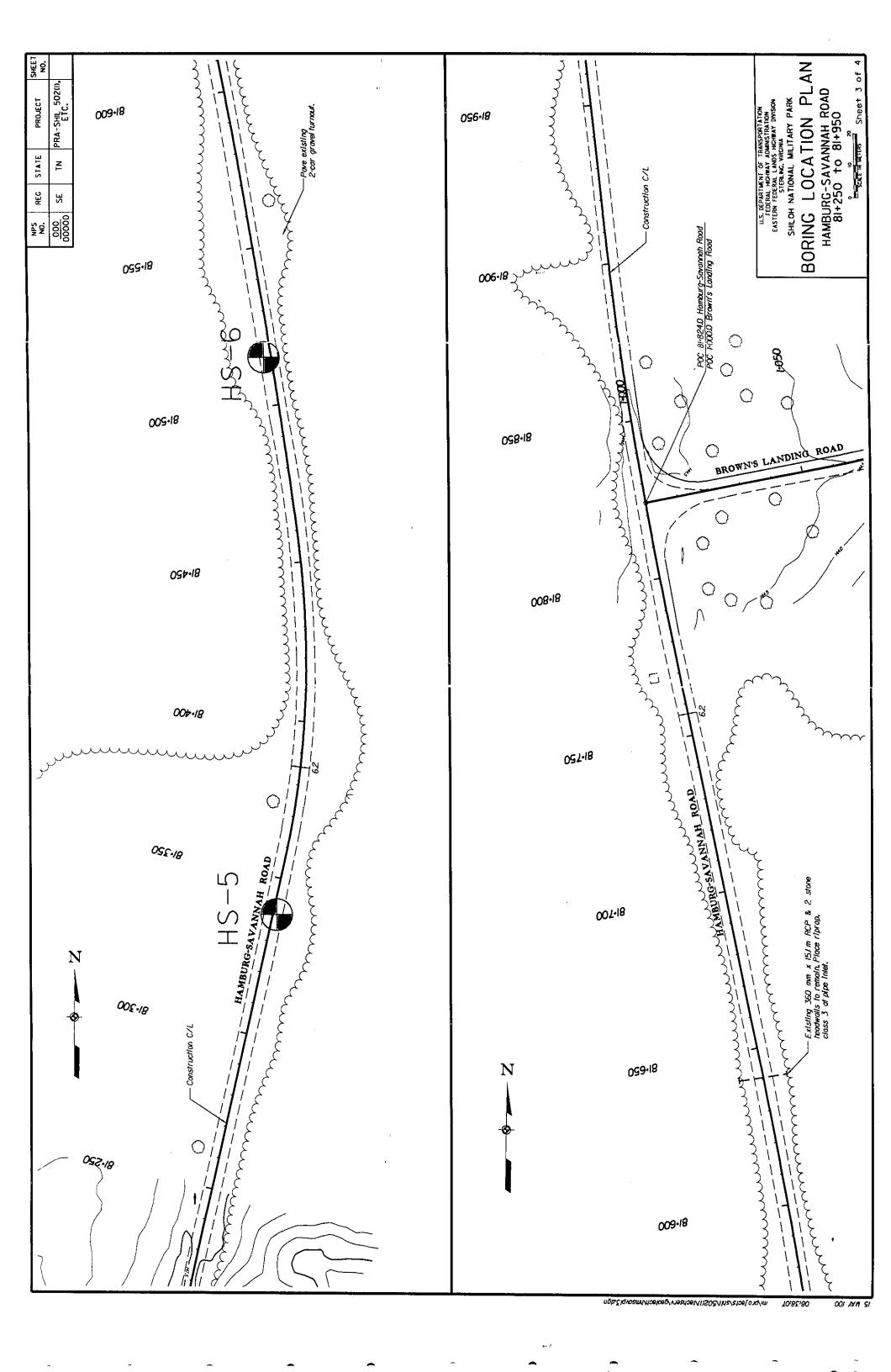


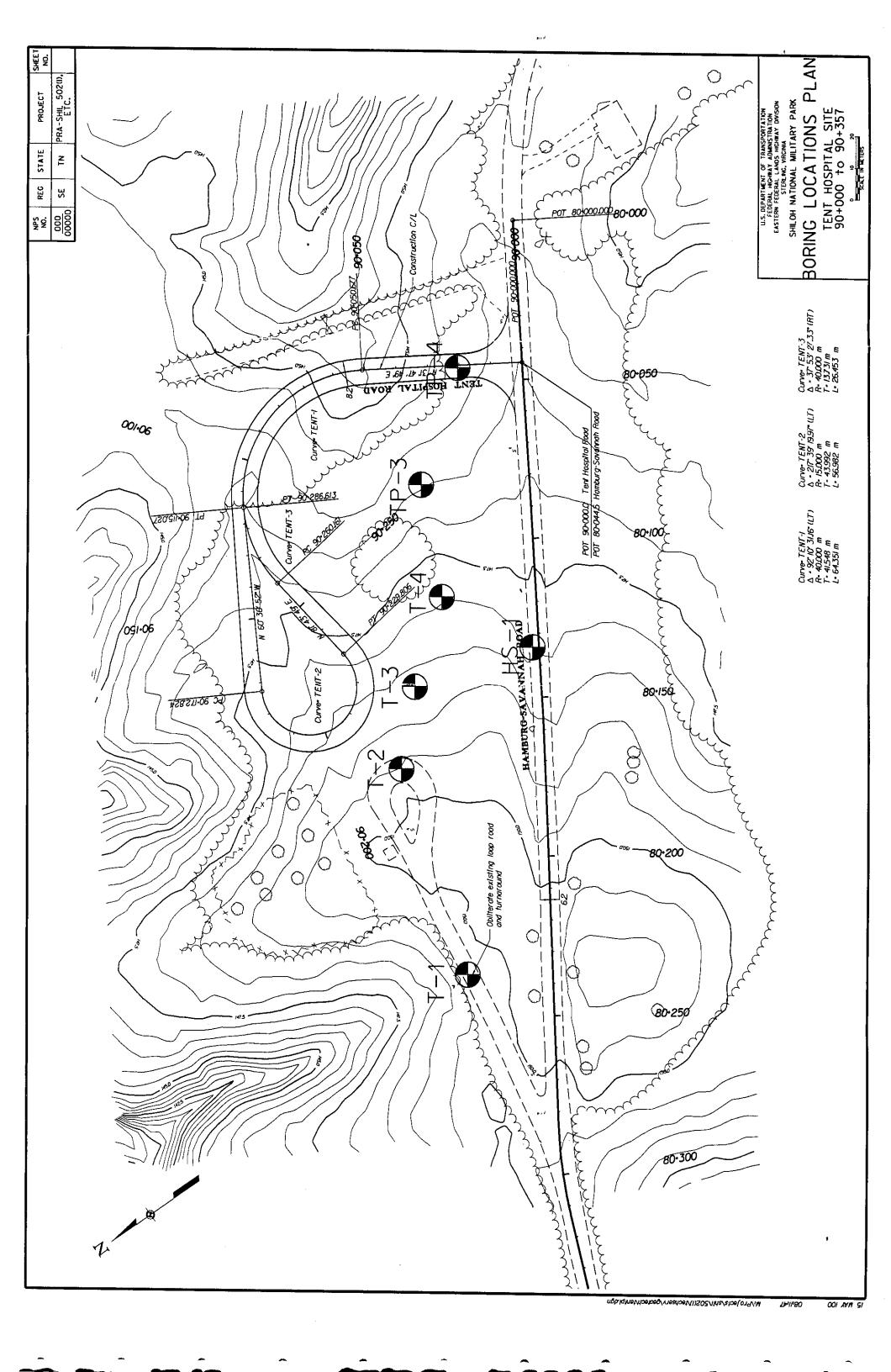


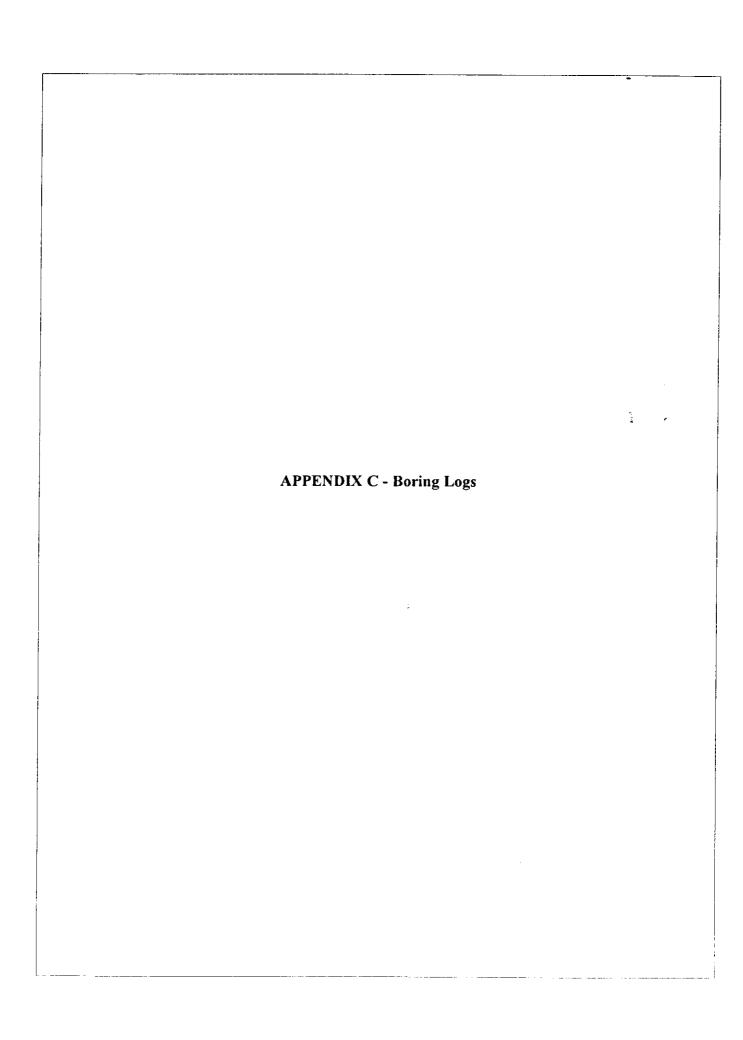












# **Drilling and Sampling Symbols**

SS: Split Spoon - 1%" I.D., 2" O.D., except where noted

ST: Shelby Tube - 2" O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible even after several days, and additional information on ground water elevations must be sought.

VISUAL METHODS FOR SOILS CLASSIFICATION Component **Distinguishing Features Boulders** Larger than 3" Gravel Coarse 1" to 3" Medium %" to 1" Fine No. 10 to 3/8" Sand The finest sand grains are just visible to the naked eye, while the largest would pass a No. 10 sieve (pinhead size). Silt 1. Lumps are easily crumbled when air-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull. Clay 1. Lumps are comparatively hard when air-dried. 2. Threads (1/4" in diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed. Order of Description

- 1. Soil Density (or consistency) Loose, Stiff, Compact, Hard, etc.
- 2. Color
- 3. Major Grain Size Composes more than 50% of the sample

4. Modifying Term -"AND" : 40% to 50% of the minor grain size

"SOME": 10% to 40%

"TRACE": 10% or less

- 5. Minor Grain Size(s)
- 6. Other (moisture content dry, moist, wet; plasticity, etc.)

For example:

(1) (2)(3)(4)(5)(4)(5)(6) Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

> (10% - 40%)(1% - 10%)

	WA-15-62	M (Rev. 3-96)						В	ORI	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS MIGHWAY DIVISION					
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water	Level	L						_			Boring Begans 3-6-96 Completed: 8-6-96					
Time											Ground Elevation: Weather: CLERE					
Data			-				,	L	- <del>y</del>		Inspector: THORNTON Operator: KINGSLEY HUGHE					
. <b>.</b> .	•	۽ ۾	50.0	1	7	* N	pler	£ 2	-	8 7	Hammer Weight 63.5 +/- 1kg					
Sample Number	Sampl	Depth From To (Meters)	Fotal Length of Recovered Sample	Pooket Penetromet	Kg/cm	Torvana Kg/om2	No. of Blows on Sampler	for Idenmi Increments	Depth (Meters)	Elevetion (Meters)	DESCRIPTION					
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Compo	onent l	Distinguis	hing Fe	<u>atures</u>							e .
Boulde	ers I	arger tha	n 75mm	ו							
Gravel Coarse Mediu Fine	ım 9	25mm to 7 2.5mm to 1 2.0mm to 9	25mm	4. 798 80	•						
Sand	T s	The finest ieve (pinh	sand gra ead size	ains are	just vi:	sible to t	he naked	l eye, v	while the large	st would pass	s a 2.0mm
Silt	2	. Lumps a . Feels gr . A moist When so	itty betw pat whe	veen the en shake	teeth. en in th		f the han	d will	appear shiny a	and wet.	
Clay	2.	end.	(3mm d	iameter	) of co	nsiderabl	e length		upport their ov e palm of the l		nen held by one
					Ord	er of De	scriptio	n			
1. 2. 3.	Soil Densit Color	ty (or con	sistency	) - Loos	se, Stiff	f, Compa	ct, Hard	, etc.			
3. 4.	Major Grai Modifying		Compose AND" SOM" TRAG	 E''	than 50 ; ;		50% of 540%		inor grain size	:	
5. 5.	Minor Grai Other (moi		)		, wet; p						
For exan	nple:										
	(1)		(2)	(3)	(4)	(5)	(4)	(5)	(6)		

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

(10% - 40%)

(1% - 10%)

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	ng Loc						_			T	Type of Boring: SS Drilling Mud Type					
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rime			•						•	G	round Elevations	<del></del>		Weathe	r: CLE	NR.
Jote				$\neg \uparrow$			<u> </u>			In	spector: TWORNT	612	Oper	ators H	reher k	MGCLEY
		ء في ا	5 0	\$		* 5		_	ç -	. Н	lommer Weight 63.5					
Semp1	Sample	Depth FromTo (Meters.)	Total Length of Recovered Sample	Pooket enetrome	Kg/cm2 Torvane Kg/cm2	No. of Blows on Sampler for 158mm	incremen	Bepth (Heters	Elevation		D	ESCI	RIF	101T <sup>c</sup>	1	
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- 1.32	. 22	0.91	0.61	4.5	-	6		-			<b>4 </b>					
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# **Drilling and Sampling Symbols**

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ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METHODS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>

### **Order of Description**

1.	Soil Density (or co	nsistency) - Lo	ose, Sti	iff, Compact, Hard, etc.
2.	Color			
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	;	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture co	ntent - drv. mo:	ist, wet	: plasticity, etc.)

	WA-15-62	M (Rev. 3-9	96)						E	30R	I	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
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Borin	ng Loc						<u>- (1)</u>						Type of Boring: SS Orilling Mud Type:
	· <b>3</b>												Cosing Used: SoLID Size: A 1/2 WIA
Water	water Level .												Boring Begani 8 - 6-96 Completed: 8-6-96
Time													Ground Elevation: Weather: CLEAR
Date	-												Inspector: THORNTON Operator: KINGSLEY, HUGHES
:		10	_	5 7			• 01	lowe	Ę	1,0	_	8 0	Hammer Weight 63.5 +/- 1kg
Sampie Number	Semple	Depth FromTo	( Meters )	Total Length of Regovere Sample	Pooket	Kg/cm	Torvane Kg/cm2	No. of Blows on Sampler	for 158	Depth	He ter	Elevation (Meters )	DESCRIPTION
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7-3	SS	0.41	52	0.61	4.5	5		10		╛ _	<u> </u>	_	DET TO
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METRODS FOR SOILS CLASSIFICATION
Compo	nent <u>Distinguishing Features</u>
Boulder	Larger than 75mm
Gravel Coarse Medium Fine	
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
1.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.

1.	Soil Density (or con	nsistency) - Lo	ose, Si	iff, Compact, Hard, etc.							
2.	Color										
3.	Major Grain Size -	Composes mo	re than	50% of the sample							
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size							
		"SOME"	:	10% to 40%							
		"TRACE"	:	10% or less							
5. 6.	Minor Grain Size (s Other (moisture cor		ist, we	; plasticity, etc.)							

# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

Shelby Tube - 50mm O.D., except where noted ST:

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

	VISUAL METHODS FOR SOILS CLASSIFICATION											
Comp	nent Distinguishing Features											
Boulde	Boulders Larger than 75mm											
Gravel Coars Medi Fine												
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).											
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>											
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>											
	Order of Description											
1. 2.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. Color											
3.	Major Grain Size - Composes more than 50% of the sample											
4.	Modifying Term "AND": 40% to 50% of the minor grain size "SOME": 10% to 40% "TRACE": 10% or less											
5. 6.	Minor Grain Size (s) Other (moisture content - dry, moist, wet; plasticity, etc.)											
For exa	nple:											
	(1) (2) (3) (4) (5) (4) (5) (6)  Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)											

(10% - 40%)

(1% - 10%)

#### **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Compor	nent Distinguishing Features
Boulder	s Larger than 75mm
Gravel Coarse Medium Fine	
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
1	Sail Density (or consistency) Loose Stiff Compact Hard etc

1.	Soil Density (or co	nsistency) - Lo	ose, St	iff, Compact, Hard, etc.
2.	Color	• .		•
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture co	ntent - dry, mo:	ist, wet	; plasticity, etc.)
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ı									ORI	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
	Proj	ect Na	eme: P	RA :	<b>SHIL</b>	_ 50	02 (1)	<u> </u>			Boring No. 1 C- \ Date: 8-6-96 Sheet \ of \
											Type of Boring: SS Drilling Mud Type:
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'	Time										Ground Elevation: Weather: CLEAR
	Date					<del></del>		_	•	T	Inspector: THORTON Operator: HUGHES, KINGSLE
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#### **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> </ol>
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

#### **Order of Description**

1.	Soil Density (or co	nsistency) - L	oose, Sti	ff, Compact, Hard, etc.
2.	Color	•		•
3.	Major Grain Size -	Composes mo	ore than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size

"SOME" : 10% to 40% "TRACE" : 10% or less

5. Minor Grain Size (s)

6. Other (moisture content - dry, moist, wet; plasticity, etc.)

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Borin	g Loc	stion:								Type of Boring: Drilling Mud Type:					
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Date										Inspector: THORNTON Operator: KINGSLEY   HUGHET					
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Proj	oct Na	mo: PR	 NZ 4	\ <u></u>	502	(I)				Boring No. PLT- 4 Date: 8-1-96 Sheet 1 of 1					
1	ng Loc	ations								Type of Boring: Orilling Mud Type:					
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Sample Number	Samp	Depth FromTo (Meters)	Total Length of Recovered Sample	Pooket Penetromet	Torrana Kg/an2	No. of Blows on Sampler for 150mm	[nerem	Depth (Heters	Elevation (Meters)	DESCRIPTION					
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Ì	Proje	ct No	me: ~	2R.		416	_	502	(1)				Boring No. PLT - 5 Date: 8-1 -96 Sheet ( of )					
- 1		g Loc	ation	ı									Type of Boring: Drilling Mud Type:					
	PITTSBURG LANDING ROAD (																	
Ì	Water	Love	1				ļ						Boring Began: 8-1 -96 Completed: 8-1 -96					
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	Sample Number Semple Type		Dep	Here	Total Langth of Recovered	Samp Pook	Penetromet Kg/cm2	Kg/cm2 Torvane Kg/cm2	No. of Blows on Sampler for 150mm	Increm		Elevetion (Meters )	DESCRIPTION					
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ŀ	Proje	ct Nar	me: -	70		5,4			202	2. (1)		<u></u>		Boring No. PLI-9 Date: 8-8-96 Sheet ( of )			
		g Loc												Type of Boring: SS Orilling Mud Type:			
					ンノ	RG	, \	~ &	CTG,	ころら	e.	.oro	(I)	Casing Used: SOLIO Size: 4 12 N/A			
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1		[		<u> </u>	5	9		<u> </u>		5 5				Hammer Weight 63.5 +/- 1kg			
	Sample Number	Sample	Depth	(Meters)	Total Length	of Recover Sample	Pooket	Kg/cm2	Torvane Kg/cm2	No. of Blows on Sampler	Increment	Depth (Heters	Elevation (Meters)				
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#### **Drilling and Sampling Symbols**

Split Spoon - 34.9mm I.D., 50mm O.D., except where noted SS:

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METHODS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>

#### **Order of Description**

1.	Soil Density (or co	nsistency) - Lo	ose, St	iff, Compact, Hard, etc.
2.	Color			
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		

Other (moisture content - dry, moist, wet; plasticity, etc.)

	FHVA-15-6	2M (Rav.	3-96)				<del>- ·</del>		<u> </u>	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION							
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. 1	ng Loc												Type of Boring: SS Drilling Mud Type				
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Time	Time										· · · · ·	Ground Elevation: Weather: CLEAR					
Dote	ı												Inspector: THORNTON Operator: KINGSLEY HUG				
<del> </del>			• ~	5	P				3 5	5	_	ç ~	Hammer Weight 63.5 +/- 1kg				
Sample	Sample	Depth	(Meters	Total Lan	of Recovered Sample	Pooket	Kg/cm2	Torvane Kg/cm2	No. of Blove on Sempler for 158mm	Increments	Depth (Heters)	Elevation (Meters)	DESCRIPTION				
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Fine	2.0mm to 9.5mm
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Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.
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Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.

#### Order of Description

1.	Soil Density (or co	insistency) - L	oose, sui	i, Compaci, Haro	ı, etc.	
2.	Color					
3.	Major Grain Size	Composes me	ore than 5	0% of the sampl	e	
4.	Modifying Term	"AND"	:	40% to 50% o	of the minor	grain size

"SOME" : 10% to 40% "TRACE" : 10% or less

Minor Grain Size (s)

Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

5.

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)	Boring Locations								- 3	<u> </u>	Type of Boring: SS Orilling Mud Type:				
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r					5	7						<del></del> -	7		Inspector: THORNTON Operator: KINGSLEY HUGHET
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	• •	"SOME"	:	10% to 40%									
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5.	Minor Grain Size (	s)											
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)												

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5.	Minor Grain Size (	s)		
6	Other (moisture co	ntent - dry mo	ist, wet	nlasticity, etc.)

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ORM: FHWA-15-62M (Rev. 3-96)

# RORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METHODS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, St	iff, Compact, Hard, etc.
2.	Color			•
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less

5. Minor Grain Size (s)

6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

1.

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Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
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	Order of Description
	▼ ·

1.	Soil Density (or co	nsistency) - Lo	ose, St	iff, Compact, Hard, etc.
2.	Color	•		, , , , , , , , , , , , , , , , , , , ,
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture cor	itent - dry, moi	ist, wet	: plasticity, etc.)

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Jata												Inspector: THORN TON Operator: KINGSLEY, HUGHE
	T	۔ ي	5 0	3			e il	§ 2	_	5	~	Hammer Weight 63.5 +/- 1kg
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Medium	9.5mm to 25mm								
Fine	2.0mm to 9.5mm								
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).								
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>								
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>								
	Order of Description								

1. 2. 3.	Soil Density (or con Color Major Grain Size -	•		ff, Compact, Hard, etc.
4.	Modifying Term	"AND" "SOME" "TRACE"	:	40% to 50% of the minor grain size 10% to 40% 10% or less
5. 6.	Minor Grain Size (s Other (moisture cor	•	st, wet;	plasticity, etc.)
For exa	mple:			



# BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
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ator	Leve	1											Boring Begoni 7-13-96 Completed: 8-13-96
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ste										,			Inspector: THORNTON Operator: KINGSLEY HUGHE
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Grave Coar Medi Fine	se 25mm to 75mm um 9.5mm to 25mm									
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Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist not will appear the same whether challen in the content of the content</li></ol>									
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.									
	Order of Description									
1. 2.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. Color									
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	"TRACE": 10% or less Minor Grain Size (s) Other (moisture content - dry, moist, wet; plasticity, etc.)									
For exan	nple:									

(1) (2) (3) (4)(5) (4) (5) (6)Medium dense, reddish brown SILT, some fine sand, trace of clay (moist) (10% - 40%)(1% - 10%)

BORING LOG  U. S. DEPARTMENT OF TRANSPOR FEOGRAL HIGHWAY ADMINISTRATI EASTERN FEDERAL LANDS HIGHWAY DI												HIGHWAY ADMINISTRATION	
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5.	Minor Grain Size (	s)								
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			Oro	ler of Description	n										
1. 2.	Color														
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4.	Modifying Term	"AND"		•	the minor grain size										
		"SOME"	:	10% to 40%	and the second										
		"TRACE"	:	10% or less											
5.	Minor Grain Size (	s)													
6.	Other (moisture con	ntent - dry, mo	ist, wet; ¡	plasticity, etc.)											
Fог ел	cample:														
	(1)	(2) (3)	(4)	(5) (4)	(5) (6)										
	Medium dense, rede	tish brown SIL	T, some	fine sand, trace o	f clay (moist)										

(10% - 40%)

(1% - 10%)

7	RH; F	WA-15-62	M (Rev.	3-96)							<del></del>						LLC DEPARTMENT OF TRANSPORTATION
	BORING L											E	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION				
Ď	rojo	ct No	m <del>o</del> :	7	2.2		<	40	· .	=	50	7.0	(1.2				Boring No. CP_ 5 Date: 8-13-96 Sheet \ of \
' - } 3	orin	g Loc			•								~.,				Type of Boring: SC Drilling Mud Type:
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	ıme											$\top$					Ground Elevation: Weather: CLEAR
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# **Drilling and Sampling Symbols**

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# VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METHODS FOR SOILS CLASSIFICATION
Compone	<u>Distinguishing Features</u>
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
1. Se	oil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.

1.	Soil Density (or co	nsistency) - Lo	ose, Sti	ff, Compact, Hard, etc.							
2.	Color			, , , , , , , , , , , , , , , , , , , ,							
3.	Major Grain Size - Composes more than 50% of the sample										
4.	Modifying Term	"AND"	: .	40% to 50% of the minor grain size							
		"SOME"	:	10% to 40%							
		"TRACE"	:	10% or less							
5.	Minor Grain Size (s	s)									
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)										

		MA-15-62	M (Rev. )	3-96)	<del></del>				В	ORI	NG	LOG		FEDERAL	INT OF TRANSPORTATION HIGHWAY ADMINISTRATION RAL LANDS HIGHWAY DIVISION
<u>==</u> مرد	0,0	ct No	me:	7	RA	CH	:	= 5	<b>-</b> (	.\		Boring No. CP_6	Dote:	8-13-96	Sheet \ of \
}  }∘	r10	g Loc						20		٠		Type of Boring:	85		Orilling Mud Type
,					T _H	7, <	TSB	uec	`	ED	7	Cosing Used: Coce	Sizer	41/2	214
٠.	ter	Lovo	l									Boring Begani 8-13-	96	Complet	ted: 8-13 -96
<u> </u>												Ground Elevation:		Weather	CLEAR
<u>•</u>		<u> </u>										Inspector: THORNTOR	_ 0ρ <del>ο</del>		
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Sac No.	Numbe	Sampl Type	Programme Progra	(Heter	Total Length of Recovered Semple	Penetrome	Torvana Kg/cm2	No. of Blows on Sampler	for 158 Increme	Depth (Heters)	Elevetion (Meters)	DES	SCRI	PTION	1
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		<b>5</b> \$	017		0.36	1.0		5				very stiff, Br	>100r	red,	CLAY.
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				-1				10	)	0.73	-	some sill-, cmoist)		4	
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Compe	onent Distinguishing Features											
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Gravel												
Coars	e 25mm to 75mm											
Medit	9.5mm to 25mm											
Fine	2.0mm to 9.5mm											
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).											
Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.											
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>											
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3.	Major Grain Size - Composes more than 50% of the sample											
4.	Modifying Term "AND": 40% to 50% of the minor grain size											
	"SOME" : 10% to 40%											
	"TRACE" : 10% or less											
	Minor Grain Size (s)											
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)											
For exan	nple:											

(5)

(4)

(1% - 10%)

(5) (6)

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(1)

(2)

(3)

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

ORM: FHWA-15-62M	(Rev. 3-96)

# BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

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Pro	Ject N	lame: F	PRA	S	H11_	50z	-C1)		Boring No. CP 7 Doto: 8-14-96 Shoot \ of	<u></u>
lor	ing La	cations	· · · · · ·						Type of Boring: SS Drilling Mud	Type
		JOB 110	TH	1 <1	7756	sur c	23	<u> </u>	Cosing Used: Coee Size: 4/2 NIX	
ű t	er Lev	ol							Boring Begans 8-14-96 Completed: 8-14-96	
fwa			· · <u></u> _						Ground Elevetion: Weather: CLEAR	
ote	·								Inspector: THORNTON Operator: KINGSLEY HU	
		ے ۔	5 5		~	ler ier	<u>.</u> -	٠ ۶ -		
Number	Sampl	Depth FromTo	Total Le	Pooke	Kg/cm Torver	No. of Blows on Sampler for 158mm	Increments Depth (Heters)	Elevetion	DESCRIPTION	
		م م م م						↓	0.07 m _ AC TO.0	
	-	0.19	1	_	-	3	0-19	<del> </del>	O.12 M RPCC	
•	SS	6.80	0-40	3.	0	7	-	†	very soft to stiff, gray,	
		1000				5		<del> </del>	SILT, Some CI	
_	-	0.80	-			3	0.30	<del> </del>	SILT, Some Clay, some f.m Sand (moist- to wel	
-7_	SS	1.41	0.55	a-c	>	1	┥ -	+	1-m 20mg (moist- 48 48	
-		1			1			_		
			-		<u> </u>	1	1.41			:
-3	SS	1.41	0-40	-			_	-		
	_					1		<del></del>		
		2.2.2	ļ		-	ı	2.62			
4.	22	2-02	0.50			wow/	<b>H</b>	~	new soft to working stift,	
_		7.2-3			<u> </u>		1 -	-	group, some fin some some clay (wet).	۱۱ خ
						V	3.63	_	some clay (wet).	
ō	22	3.24	0.45			3	-	.		
		3.04				F5	1 -	-		
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Silt  1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.							
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	Order of Description						
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4.	Modifying Term "AND": 40% to 50% of the minor grain size "SOME": 10% to 40% "TRACE": 10% or less						
5. 6.	Minor Grain Size (s) Other (moisture content - dry, moist, wet; plasticity, etc.)						
For exam	nple:						

(5)

(4)

(1% - 10%)

(5) (6)

(1)

(2)

(3)

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

Je K	FHWA-15-6	2M (Rov. 3-96)			<del></del>			D:	OD:	IN	IC.	U. S. DEPARTMENT OF TRANSPORTAT FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
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oro.	jest Na	omo: P	49°	S	HIL	. 6	502	ارم	7			Boring No. CP_ 8   Dote: 896 Sheet \ of \
3orı	Boring Locations									Type of Boring: SS Drilling Mud Typ		
	$\mathcal{C}$	er112	1 _H>	> ,	775	<u> </u>	LR-G		EL	>		Cosing Used: Coee Size: 4/2 NIA
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Ime							· · · · · · · · · · · · · · · · · · ·					Ground Elevation: Weather: CLEAR
ote												Inspector: THORATOR Operator: KINGSLEY HUGS
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Number	Sample Type	Depth FromTa	Total Leng of Recover Sample	Pooket	Kg/cm2	Kg/cm2	No. of Blows on Sampler for 158mm	Increments	Dapth (Maters )	Elevation	( Meters	DESCRIPTION
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									6.18	_		0.15 RPCC
·***	55	0.19	0.22	-	-		4		_	1		LOSSE, brown silty, f-c sand, trace to some clay (moisi-)
<u>.</u>		8-80	1				3 3			-		trace to some clay (moisi-)
		1000					4	$\dashv$	<u>0</u> 79	t	Ì	
, -2	SS	0.80	0.40				3					
	+	1.1.41	0.40	٦.	0		3	$\dashv$		_		•
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1-3	22	1.41	0.29	1-	0		<u>ا</u> ء			-		very loose to loose, brown,
							1			_		Silty SAND, some Clay
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Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.
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6.	Other (moisture con		ist wer	placticity ato )								

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
EASTERN FEDERAL LANDS HIGHWAY DIVISION

ORM: FHWA-15-62M (Rev. 3-96) **BORING LOG** 

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lori	ng Loc		•						Type of Boring:	<u>ss</u>		Drilling Mud Type:
	$\mathcal{C}^{\prime}$	\$110°	7 _H	> 1.	1.125	sur-G	23	>	Cosing Used: Core	Size: 7	1/2	214
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ıme	-								Ground Elevations		Weather	CLEAR
ote	-						· ·		Inspector: THORATE	D Oper	retori Y	1126 REY HUGHES
		، ي	2 0	3		* L E	_	5 ~	Hammer Weight 63.5	+/- 1kg		
Number	Sample Type	Depth FromTo (Heters)	Total Ler of Regove Sample	Pooket Penetrom	Kg/cm2	No. of Blows on Sempler for 150mm	Depth ( Meters	Elevation (Meters )	DE	SCRIF	OITC	l
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		0.22				4			very boxe to		mi	dense
4	55	6.83	0.46	<b>3</b> -	0	9	] _		Day, Silty	, f-c	SA	50, some
		0.83		-		4	0.83	<u></u>	clay (resois			
-7.	SS	0.83	01.0	1- 0	ا د	1	-	<u> </u>				•
-4.						1	1.44	_				
<u>-3</u>	22	1.44				Now	1	-	very looke,	Sean	۶ ۱	ill-y, f-c
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Water	cievations	must be s	ougnt.						<u> </u>					
			VISUAL M	IETHOL	OS FOR SOII	LS CLASSIF	EICATION							
Comp	onent	Distingu	ishing Feature	<u>s</u>					•					
Boulc	iers	Larger th	ian 75mm 🧪		•									
Grave	·i													
Coar	rse	25mm to	75mm						•					
Med	ium	9.5mm to 25mm												
Fine	•	2.0mm to 9.5mm												
Sand		The fines sieve (pir	t sand grains a thead size).	ire just vi	isible to the na	ked eye, whil	le the larges	t would pass	; a 2.0mm					
Silt			are easily crui											
			ritty between t				•		•					
		3. A mois When s	t pat when sha squeezed it wil	iken in th I appear	te palm of the dry and dull.	hand will app	ear shiny ar	id wet.						
Clay		<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> </ol>												
			t pat will appea	ar the sar	ne whether sh	aken in the pa	alm of the h	and or squee	zed.					
				Ord	ler of Descrip	tion								
1.		sity (or co	nsistency) - Lo	ose, Stif	f, Compact, H	ard, etc.								
2.	Color													
3.	Major Gr	ain Size -	Composes mo	re than 5										
4.	Modifyin	g Term	"AND"	:	40% to 50%	of the minor	r grain size							
			"SOME"	:	10% to 40%	0								
_			"TRACE"	:	10% or less									
5.		ain Size (s	*											
6.	Other (me	oisture cor	itent - dry, moi	ist, wet; p	plasticity, etc.)	ı								
For exa	mple:													
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, roje	oct No	mo: P	'RA	SH	\\_ i	501	. C .		··· <u>-</u>	Boring No. CP_10 Date: 8-13-96 Sheet \ of \
iorir	ng Loc	ation:			<u> </u>			·		Type of Boring: SS Orilling Mud Type:
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ater	Love	-1								Boring Begani 8-13-96 Completed: 8-13-96
ime										Ground Elevation: Weather: CLEAR
oto										Inspector: THORNTON Operator: KINGSLEY HUGHES
! • L		ے ہے	5 P	3 .		love	ţ	_	8 -	Hammer Weight 63.5 +/- 1kg
Nother	Sample Type	Depth FromTo	Total Le of Recov Semple	Pooke Penetrom	Torvana Kg/cm2	No. of Blows on Sampler for 158mm	Incremer	Depth (Heters)	Elevation (Meters )	DESCRIPTION
								0.0	_	0.13 m RPCC
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		3.4	<u> </u>	-	1	<u>3</u>	$\dashv$		<del></del>	Medium stiff to very stiff, brown, elay some sill, trace Sound (moish)
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# **Drilling and Sampling Symbols**

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water	cic valions must be sought.
	VISUAL METHODS FOR SOILS CLASSIFICATION
Comp	onent Distinguishing Features
Bould	ers Larger than 75mm
Grave	1
Coar	
Medi	
Fine	The state of the s
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
SiIt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> </ol>
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> </ol>
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description
1. 2.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. Color
3.	Major Grain Size - Composes more than 50% of the sample
4.	Modifying Term "AND": 40% to 50% of the minor grain size
	"SOME" : 10% to 40%
	"TRACE" : 10% or less
5.	Minor Grain Size (s)
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)
For exar	nple:

F

(1) (2)(3) (4)(5) (4)(5) (6)Medium dense, reddish brown SILT, some fine sand, trace of clay (moist) (10% - 40%)(1% - 10%)

ORM: FI	WA-15-62	M (Rev. 3-9	6)					<del></del>			T 1		U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
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3orın	oring Locations												Type of Boring: SS Drilling Mud Type:
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ater	- Level												Boring Begans 8-13-96 Completeds 8-13-96
1me													Ground Elevations Weathers CLEAR
late													Inspector: THORNTON Operators KINGSLEY HUGHES
		_0	_	5 P	1	~	• ~	oler	- # #	-	-	8 2	Hammer Weight 63.5 +/- 1kg
San, fa	Sample Type	Dapth FromTo	(Meters)	lotal Lengt of Recovere Sample	Penetromet	Kg/cm	Torvane Kg/cm2	No. of Blous on Sampler	for 158 Increme	Depth	143 <b>6</b> E )	Elevetion (Hetere)	DESCRIPTION
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	3.5	<u> 67</u>	4		╀	_		\( \frac{1}{2} \)		<b>-</b>	+	_	very loose to loose, brown, classey, f.m SAND, some Sik- (moisi-)
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# VISUAL METHODS FOR SOILS CLASSIFICATION

	TIGOTE METHODO FOR BOILE CEASSIFICATION
Component	<u>Distinguishing Features</u>
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, Su	III, Compact, Hard, etc.
2.	Color			• •
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture cor	ntent - dry, moi	ist, wet;	plasticity, etc.)
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

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Distinguishing Features

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Component

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# VISUAL METHODS FOR SOILS CLASSIFICATION

Boulders	Larger than 75mm										
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm										
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).										
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>										
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>										
	Order of Description										
<ol> <li>Col</li> <li>Maj</li> </ol>	I Density (or consistency) - Loose, Stiff, Compact, Hard, etc.  or  jor Grain Size - Composes more than 50% of the sample  difying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less										
	or Grain Size (s) er (moisture content - dry, moist, wet; plasticity, etc.)										
For example:											
Med	(1) (2) (3) (4) (5) (4) (5) (6) flium dense, reddish brown SILT, some fine sand, trace of clay (moist)  1 (10% - 40%) (1% - 10%)										

	BORING													U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANGS HIGHWAY DIVISION		
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io	ring	Loca		<u> </u>	40			<u> 11 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1 / 1</u>			_`≃					Type of Boring: SS Drilling Mud Type:
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Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	I. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
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	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, Si	iff, Compact, Hard, etc.
2.	Color	- "		• • • • • • • • • • • • • • • • • • • •
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture con	ntent - dry, moi	ist, wet	; plasticity, etc.)
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, Sti	iff, Compact, Hard, etc.
2.	Color			
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture co	ntent - dry moi	ist wet	plasticity etc.)

	WA-15-621	BORING										U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION	
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	33	16.91	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	3 4	-0		3			<u> </u>		bown, chay, some sill,	
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SS. Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

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Fine	2.0mm to 9.5mm
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Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
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	Order of Description

1. 2. 3.	Soil Density (or con Color Major Grain Size - (			f, Compact, Hard, etc.  0% of the sample
4.	Modifying Term	"AND" "SOME" "TRACE"	: :	40% to 50% of the minor grain size 10% to 40% 10% or less
5. 6.	Minor Grain Size (s Other (moisture con		st, wet; p	plasticity, etc.)
For exam	mple:			

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	ng Loc		<u> </u>	111	-302					Type of Boring: SS Drilling Mud Type:
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lote	r Lovo	ı								Boring Begani 8-6-96 Completed: 8-6-96
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	VISUAL METHODS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

1. 2. 3.	Soil Density (or con Color Major Grain Size -			iff, Compact, Hard, etc. 50% of the sample
4.	Modifying Term	"AND" "SOME"	: :	40% to 50% of the minor grain size 10% to 40%
5. 6.	Minor Grain Size (s Other (moisture cor	•		10% or less; plasticity, etc.)
For exa	imple:			

DRM: FHWA-15-62M	(Rev. 3-96)

# BORING LOG

U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION

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	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
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	Order of Description

1.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.									
2.	Color	•		•						
3.	Major Grain Size - Composes more than 50% of the sample									
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size						
		"SOME"	:	10% to 40%						
		"TRACE"	:	10% or less						
5.	Minor Grain Size (s)									
6.	Other (moisture con	itent - dry, moi	ist, wet;	plasticity, etc.)						

For example:

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late	<del></del>							•		Inspector: THORNTON	0pe	rator: V	ingred Hurste
	<u> </u>		5 7	3		3 5	5	-	ç ~	Hammer Weight 63.5 +/	- 1kg		
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5.	Minor Grain Size (s)										
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)										

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#### **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

	CE OLIE METHODS TON SOILS CEASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Međium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	I. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	<ol><li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li><li>When squeezed it will appear dry and dull.</li></ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

#### Order of Description

1.	Sour Density (of co	nsisiency) - Lo	iose, st	III, Compact, Hard, etc.
2.	Color	**		
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (s	s)		
6.	Other (moisture cor	itent - dry, mo	ist, wet	; plasticity, etc.)
For e	vamala:			

Sem. F	WA-15-62F	1 (Roy. 3-96)						В	ORI	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
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30510	g Loce		SERV								Type of Boring: SS Orilling Mud Type:
30, 1,	.g 2000	€5	TWEEN	5	PL	I.	EC				Casing Used: SOLID Size: 1/2:5 mm NIA
ater	- Lovel			$\neg$							Boring Begani 8-1-96 Completed: 8-1-96
Two										-	Ground Elevation: Weather:
late											Inspector: THORNTON Operator: KINGSLEY   HUMES
-	<u> </u>		5 0	3			\$ L	£ \$	_	ç ~	Hammer Weight 63.5 +/- 1kg
Sen. Ae Number	Sample Tupe	Depth FromTo (Meters)	Total Length of Recovered Semple	Pooket	Kg/cm2	Torvana Kg/cm2	No. of Blows on Sampler	or 1584 Veremen	Depth (Neters)	Elevation (Meters )	DESCRIPTION
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	14	0-31	0.55	1.+	_			0			Hard, brown, CLAY, little Silt, trace fine sand (moist-)
4-1	35	18.0	0.00	4-	0		\ \		_	_	trace fine sand (moist-)
							\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		0-91		
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

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Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

### VISUAL METHODS FOR SOILS CLASSIFICATION

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Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse -	25mm to 75mm
Medium *	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

2.	Color			-
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture con	ntent - dry, mo	ist, wet	; plasticity, etc.)

Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.

For example:

1.

DRM. FH		1 (Rev. 3-96)			-	·- <u>-</u> -	<del> </del>	В	ORI	N	G	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
olos,	ct Nan	io: Pe	<u>a S</u>	<u> </u>		50	2 (1	<u>.                                    </u>				Boring No. RS_1 Date: 8-7-96. Sheet 1 of 1
	g Loce							-				Type of Boring: SS Drilling Mud Type:
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ater	Lovel											Boring Begani R-7-96 Completed: 8-7-96
two	-							<u> </u>				Ground Elevation: Weather: CLEAR
lote									<del> </del>			Inspector: THORNTON Operators KINGSELY HUGHES
		٠ -	2 P	3	~	ן אַ אַ	llove	# # C	٠.	8	Ç	Hammer Weight 63.5 +/- 1kg
Sec. ite	Sample Type	Depth FromTo (Meters)	Total Length of Recovered Sample	Penetrome	Kg/cm2	forvane Kg/cm2	No. of Blown on Sampler	for ibbam Increments	Depth (Heters)	Eleveton	(Heters)	DESCRIPTION
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7-1	5	0.31	0.51	۶.۶	5		<u>-\</u>		-	+		soft to very stiff, brown, chay,
<del></del>		,,,,,,,		_			10					truce to lite silt, trace fine sand (moisi-).
		0.91					14		17.0	-		Suna (mers. ).
1-1-2	5	1.52	0.42	٦.,	0		<del>`</del>	<del></del>	1.52	+		•
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# **Drilling and Sampling Symbols**

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VISUAL METHODS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

(1% - 10%)

			010	er or Description	711										
1. 2.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. Color														
3.	Major Grain Size -	Composes mo	re than 5	0% of the sample	e										
4.	Modifying Term	"AND"	:		f the minor grain size										
		"SOME"	:	10% to 40%	, , , , , , , , , , , , , , , , , , ,										
		"TRACE"	:	10% or less											
5.	Minor Grain Size (	s)													
6.	Other (moisture cor	ntent - dry, mo:	ist, wet; ¡	plasticity, etc.)											
For ex	ample:			•											
	(1)	(2) (3)	(4)	(5) (4)	(5) (6)										
	Medium dense, red														

(10% - 40%)

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	A.						BO	RI	NG	LOG FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION							
Proje	oct No	mo:			411	502	(1)			Boring No. 25-2 Date: 8-7-96 Sheet \ of \							
Borin	g Loc				30D			0		Type of Boring: SS Drilling Mud Type:							
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- ∢ater	Leve	1								Boring Begans 8-7-96 Completeds 8-7-96							
tme										Ground Elevation: Weather: CLEAR							
Jate				ĺ						Inspector: TWOR NTON Operator: KINGSLEY (HUMHO							
		ے و	\$ 0	3	N • N	out ler	3	_	8 7	Hammer Weight 63.5 +/- 1kg							
Samule	Sample	Depth From To	Total Lengt of Recovere Semple	Pooket Penetromet	Kg/cm2 Torvane Kg/cm2	No. of Blows on Sampler for 150mm	Incremen	(Heters)	Elevation (Meters )	DESCRIPTION							
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Ĩ-\	35	1860	0.38	1:79	5	3		-	_	CLAM, some Sill-, trace fine							
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#### **Drilling and Sampling Symbols**

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	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
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	Order of Description

1. 2. 3.	Soil Density (or con Color Major Grain Size - (	-		C, Compact, Hard, etc.
4.	Modifying Term	"AND" "SOME" "TRACE"	: : :	40% to 50% of the minor grain size 10% to 40% 10% or less
5. 6.	Minor Grain Size (s) Other (moisture con		ist, wet; p	
For exar	nple:			

	WA-15-62	BORIN								NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
Proje	et Nor	Nomo: PRA SHIL GOZU)									Boring No. RS-3 Date: 8-9-96 Sheet \ of
Borus	g Loc					<u> </u>					Type of Boring: SS Drilling Mud Type
50, 1,	.g 200.	3010				PRIN					Cosing Used: HSA Size: 1-11-5 NIA
ater	· Level				1	-					Boring Begens 8_9_96 Completed: 8-9-96
		1									Ground Elevation: Weather: CLEAR
Jata								T"	-		Inspector: THORNTON Operators KID GISTER MUSHE
-			5	D	3		100	g g		۶ -	Hammer Weight 63.5 +/- 1kg
Samul	Semple Type	Depth From To	(Meters) Total Leng	of Recovere Sample	Pooket Penetrome Ko/cm2	Torvane Kg/cm2	No. of Blows on Sampler	for total	Depth (Heters)	Elevation (Meters)	DESCRIPTION
1-1	55	0.0			2-5		1		_	_	very soft to very stiffs brown.
<u></u>						-	7.			_	CLAY, trace Silt, trace fine
						-	2		261	<del></del>	Sand (moist)
7-5	22	0-61	· ·	61	2.4		3		-	_	
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# **Drilling and Sampling Symbols**

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	13 113 113 113 1 3 TOROGE CLASSIFICATION
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Çlay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

grain size
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	WA-15-621	1 (Rav <u>. 3</u>	-96)								-	 B(	 DF	RI	Νı	G	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION
Proje	ct Non	ne:	72	RA			· ·		<u>-</u>	0	2.0	72	<u> </u>				Boring No. 254 Date: Sheet of
				<u>&gt;</u>	= 0	. (3.	<u>,</u>	20	<u>ء</u>	8	<b>O</b> F	7.7	>		-		Type of Boring: SS Drilling Mud Type:
30Fin	g Loca	tioni		(	5. h	. E 1	<del>کر</del>	5	<del>66</del>	رتد	ンぐ	ای	)				Cosing Used: SOLID Size: 112-5 NIA
}	Level	T	<del>-</del> -		<u>``</u>												Boring Begon: 8-7-96 Completed: 8-7-96
' <del></del>		·												•			Ground Elevation: Weather: CLERE
lme																	Inspector: THORNTON Operator: KINGSLEY HUGHES
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Sar. Number	Sample Type	Depth	Heters)	otal Leng	of Recovered Semple	Pooket	Kg/cm2	Torvene	Kg/cm2	No. of Blows	for 150m	Incremen	Depth	(Heters)	Elevetion	( Meters )	DESCRIPTION
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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
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1.	Soil Density (or co	nsistency) - Lo	ose, St	iff, Compact, Hard, etc.
2.	Color			•
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
	·	"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (maisture con	ntent - dry moi	ist wet	nlasticity ato \

For example:

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		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5	Minor Grain Size (	-1		

6. Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

1.

FORM: FHWA-(5-62M (Rov. 3-96)																	
	BORING												G	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION EASTERN FEDERAL LANDS HIGHWAY DIVISION			
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Borar	ing Locations PEABOOY ROAD										Œ,		Type of Boring: 55 Orilling Mud Type				
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ater	- Love	ı												Boring Begen: 8-7-96 Completed: 8-7-96			
Lime								····						Ground Elevation: Weather: CLEAR			
Jata	···			,		Ĺ_,	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	V						Inspector: THORNTON Operator: KINGLEY HUGH			
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Component	Distinguishing Features								
Boulders	Larger than 75mm								
Gravel									
Coarse	25mm to 75mm -:								
Medium	9.5mm to 25mm								
Fine	2.0mm to 9.5mm								
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).								
Silt	1. Lumps are easily crumbled when are-dried.								
	2. Feels gritty between the teeth.								
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1. 2. 3.	Soil Density (or co Color Major Grain Size -				-				
4.	Modifying Term	"AND" "SOME" "TRACE		: :		50% o 40%		inor grain siz	ze
5.	Minor Grain Size (	s)			1070 0	. 1000			
6.	Other (moisture co		noist	, wet; p	lasticity,	etc.)			
For ex	ample:								
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# BORING LOG

Boring No. E C-\ Date: 8-7-96 Sheet \ PRA SHIL BOZCI) Project Name: Drilling Mud Type: 55 Boring Location: ENSTERN CORINTH ROAD (I) Type of Borings AlG Cosing Used: SOLICO Size: 112-5 Completed: 8-7-96 Boring Began: 8-7-96 rator Lovel Weathers CLEAR Ground Elevations Operator: KINGSLEY (MIGHES Inspector: THORNTON late Hammer Weight 63.5 +/- 1kg Total Length
of Recovered
Sample
Poaket
Penetrometer
Kg/cm2 No. of Blows on Sampler for 158mm forrements Elevation (Meters ) Depth (Meters ) Depth From --To Torvana Kg/cm2 Sample Type DESCRIPTION 0-11 m AGG. BASE 0.14m stiff to stiff, brown, Medium 8 71 55 0.61 4.0 CLAY, trace Silly track fine 651 5 Soud (moist-) 4 5 0-61 3.0 8 1-2 35 1í-52 4 BHTO 1.52 M

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5.	Minor Grain Size (	s)					
6.	,	*					
U.	Other (moisture cor	itent - dry, mo	ist, wet	; plasticity, etc.)			

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Bori	ing Lo	Cations	·					·	Type of Boring:
<u></u>		エ2イヨ	ERN	-	DRIN'	TH R	910	(1)	Cosing Used: SOLID Size: 1172-5 NIA
Wate	er Leve	ol l							Boring Begani 8-7-96 Completed: 8-7-96
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Dote	· · · · · · · · · · · · · · · · · · ·							-	Inspector: THORNTON Operator: KINGSLEY HUGHE
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Sample	Sampl	Depth FromTo	Total Langtl of Recovere Sample	Pooket Penetrome	Kg/cm2 Torvana Kg/cm2	No. of Blous on Sampler for 158mm	Depth (Heters)	Elevation (Meters )	DESCRIPTION
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	Order of Description									

#### Order of Description

1.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.									
2.	Color	•		•						
3.	Major Grain Size -	Composes mo	re than	50% of the sample						
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size						
		"SOME"	:	10% to 40%						
		"TRACE"	:	10% or less						
5.	Minor Grain Size (:	s)								
6.	Other (moisture cor	ntent - dry, moi	ist, wet	; plasticity, etc.)						

BORING L																
Proje	ot Nor	no: >	P N		141		50	2 (	W	•		Boring No. 1-1 Date: 8-12-96 Sheet ( of )				
Boring Locations												Type of Boring: 성성 Drilling Mud Type:				
00	9 200	3 44 67 74										Cosing Used: HGA Size: 1-11-5 N/A				
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		•										Ground Elevations Weathers CLOUDY				
Jata			<u> </u>									Inspector: Thornton Operator: KINGSLEY HUGHE				
<u> </u>			5 8	1	3		* t		_	c ·		Hammer Weight 63.5 +/- 1kg				
Sable Number	Sample	Depth FromTo	Total Leng of Recover	Pooket	Kg/cm2	Torvene Kg/on2	No. of Bloud on Sempler for 1588sm	Increment	Depth (Meters)	Elevation	Heters	DESCRIPTION				
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1-3	22	1.5	30.61				30		193	<u> </u>						
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# **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

	•							
Compone	ent Distinguishing Features							
Boulders	Larger than 75mm							
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm							
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).							
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>							
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>							
	Order of Description							
2. C 3. M	oil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. olor lajor Grain Size - Composes more than 50% of the sample lodifying Term "AND": 40% to 50% of the minor grain size "SOME": 10% to 40%							
	"TRACE": 10% or less  Minor Grain Size (s)  Other (moisture content - dry, moist, wet; plasticity, etc.)							
or example	le:							
М	(1) (2) (3) (4) (5) (4) (5) (6) edium dense, reddish brown SILT, some fine sand, trace of clay (moist)							
	(10% - 40%) (1% - 10%)							

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Borin	Locations TENT HOSPITAL													Type of Boring: SS Drilling Mud Type:
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ter	Level													Boring Began: 8-7-96 Completed: 8-7-96
Time	•	•												Ground Elevations Weathers CLEAR
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#### **Drilling and Sampling Symbols**

Split Spoon - 34.9mm I.D., 50mm O.D., except where noted SS:

Shelby Tube - 50mm O.D., except where noted ST:

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

1. 2.	Color	•		iff, Compact, Hard, etc.					
3.	Major Grain Size -	-	re man						
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size					
		"SOME"	:	10% to 40%					
		"TRACE"	:	10% or less					
5.	Minor Grain Size (s	;)							
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)								
For exa	mple:								

FORM: F	HWA-15-6	2M (Rev. )	)-9 <u>6)</u>										<u>'</u>		
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Proj	ect Na	met	F	PA	8	141		5	> z	٠(	<u>ر</u> ر	)			Boring No. 1-2 Date: 8-1-96. Sheet \ of \
Borin	ng Loc	ationi		(EN											Type of Borings 55 Drilling Mud Type:
				HEXY.											Cosing Used: SOLID Size: WZ 5mm N/A
ater	tor Level													Boring Began: 8-7-96 Completed: 8-7-96	
Time	*	*													Ground Elevation: Weather: CLERC
Date	·														Inspector: THORATON Operator: KINGLEY (MUCHES
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried.
	2. Feels gritty between the teeth.
	3. A moist pat when shaken in the palm of the hand will appear shiny and wet.
	When squeezed it will appear dry and dull.
Clay	1. Lumps are comparatively hard when air-dried.
•	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, Stif	f, Compact, Hard	, etc.	
2.	Color			·		
3.	Major Grain Size -	Composes mo	re than S	0% of the sample	;	
4.	Modifying Term	"AND"	:	40% to 50% of	f the minor grain s	size
	• •	"SOME"	:	10% to 40%	_	
		"TRACE"	:	10% or less		
5.	Minor Grain Size (	s)				
6.	Other (moisture con	ntent - dry, mo	ist, wet;	plasticity, etc.)		
		·				
For ex	xample:					
	(1)	$(2) \qquad (3)$	(4)	(5) (4)	(5) (6)	
	Medium dense, red	dish brown SII	LT, some	fine sand, trace of	of clay (moist)	

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(10% - 40%) (1% - 10%)

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Borso	ng Loc		TE				_	Type of Boring: SS Drilling Mud Type:		
50, 1,	.g coo	54,0.4			) (v			Cosing Used: SOLID Size: 1/2-5 NIA		
Water	- Leve	l								Boring Begani 8-7-96 Completed: 8-7-96
Time		•								Ground Elevation: Weather: CLERR
Date									<del></del>	Inspector: THORNTON Operator: KINGSLEY HUGHES
			5 7	3		3 5	£ \$	_	£ ~	Hammer Weight 63.5 +/- 1kg
Sample Number	Sample Type	Depth From :-To	Total Leng of Recover	Pooket Penetrome	Torvane Kg/cm2	No. of Blous on Sampler	for 156m	Depth (Heters)	Elevetion (Meters )	DESCRIPTION
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J-2	((	مراهاره	0.56	3.0		4		U.61		Very Sift, brown, clay,
	-	4.2	\			11	· ·		_	some Silt, track fine sand
	ļ	معمدر	1			14		1-77	-	(moish)
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

Distinguishing Features

PA: Power Auger Sample

Component

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Boulde	Larger than 75mm
Gravel Coars Media Fine	te 25mm to 75mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
- Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
1. 2. 3. 4.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.  Color  Major Grain Size - Composes more than 50% of the sample  Modifying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less
5. 6.	"TRACE": 10% or less  Minor Grain Size (s)  Other (moisture content - dry, moist, wet; plasticity, etc.)
For exa	mple:
	(1) (2) (3) (4) (5) (4) (5) (6) Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

(10% - 40%)

(1% - 10%)

F SRM.	MA-15-62	M (Ray. )	<u> </u>			,				30	PRI	NC	j L	OG		•		/		OEPARTI FEDERAL STERN FED	L HIGH	WAY AC	HIŇISTF	OITA	M
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

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## VISUAL METHODS FOR SOILS CLASSIFICATION

Compone	nt Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
2. C	oil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. olor
3. M	Iajor Grain Size - Composes more than 50% of the sample Iodifying Term "AND": 40% to 50% of the minor grain size "SOME": 10% to 40% "TRACE": 10% or less
5. M	linor Grain Size (s)
	ther (moisture content - dry, moist, wet; plasticity, etc.)

(5)

(4)

(1% - 10%)

(2)

(3)

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

Distinguishing Features

PA: Power Auger Sample

Component

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Boulde	rs Larger than 75mm
Gravel Coars Mediu Fine	
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description
1. 2. 3. 4.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.  Color  Major Grain Size - Composes more than 50% of the sample  Modifying Term  "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less
5.	Minor Grain Size (s)
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)
For exa	mple:
	(1) (2) (3) (4) (5) (4) (5) (6)  Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)  [

FORM:	HWA-15-6	2M (Rev. 3-9	16)		<del> </del>	_				
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Proj	oct Na	, seme	>5 6	84	1L F	502	رت			Boring No. 1-1 Date: 8-9-96 Sheet \ of \
Boru	ng Loc	ations	1-1	v. >c=c	(42)	NEMO	se.	AL		Type of Borings SS Drilling Mud Type
	5	FRO	N E	ohe a	0F 70	NEME	<b>Σ</b> τ (	HAM	er Burc	Cosing Used: HER Size: 1711-5 NIA
Wate	r Leve									Boring Begans 8-9-96 Completed: 8-9-96
Lime		•								Ground Elevation: Weather: CLERR
Date										Inspector: THORATON Operator: KINGSLEY (HUGITI
.m. @ L		و ا	~ 5 8	\$	N .	10 10	اي	. ~	8 2	Hammer Weight 63.5 +/- 1kg
Sample Number	Sample	Capth From	[Heters Total Le	Sample Pooket Penetrome	Kg/cm2 Torvana Kg/cm2	No. of Blove on Sampler for 158mm	Increment	Depth (Heters	Elevetion (Meters )	DESCRIPTION
1-1	55	0.0	^T			3		٥-٥	-	Medium dense, brown, silty,
		0-1	0.3	7.0	7	8	$\dashv$	$\exists$		fine to coarse SAND, trace
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

	VISUAL METHODS FOR SOILS CLASSIFICATION
Compor	ent Distinguishing Features
Boulder	Larger than 75mm
Gravel Coarse Mediur Fine	
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>1Lumps are comparatively hard when air-dried.</li> <li>2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol> Order of Description
2. 3.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.  Color  Major Grain Size - Composes more than 50% of the sample  Modifying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less
	Minor Grain Size (s) Other (moisture content - dry, moist, wet; plasticity, etc.)

(2)

(3)

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

(5)

(4)

(1% - 10%)

	WA-15-62	1 (Rev. 3-96)				-	. "	E	30	ORI	N	G	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION CASTERN FEDERAL LANDS HIGHWAY DIVISION
Pro.le	ct Non	iei 🔿	0.0		<u> </u>		=	 52	Boring No. 1 - 7   Date: 8 - 8 - 9% Sheet   of				
	Project Name: PRA SHIL 502(1)  Boring Location: JOHNSTON MEMORIAL												Type of Boring: SS Drilling Mud Type:
Borin	Skind Focations 704157 10.												Casing Used: SOLID Size: 117-Fm NIR
Water	Water Level .												Boring Begant 8-8-96 Completed: 8-8-96
Time											•		Ground Elevations Weathers CLERR
Date	-									<u>,</u>			Inspector: THORATOR Operator: KINGSUZY HUSHES
	<u> </u>		5 7				: :	<u>_</u>	3			,	Hammer Weight 63.5 +/- 1kg
Sample Number	Sample Two	Depth FromTo	Total Length of Recovered Sample	Pooket	Kg/cm2	Torvane Kg/on2	No. of Blous	for 158	Incremen	Depth (Heters)	Elevetion	(Heters)	DESCRIPTION
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

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Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Gravel Coarse 25mm to 75mm Medium 9.5mm to 25mm Fine 2.0mm to 9.5mm  Sand The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).  Silt 1. Lumps are easily crumbled when are-dried. 2. Feels gritty between the teeth. 3. A moist pat when shaken in the palm of the hand will appear shiny and wet. When squeezed it will appear dry and dull.  Clay 1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight when held by one end. 3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.  Order of Description  1. Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. 2. Color 3. Major Grain Size - Composes more than 50% of the sample 4. Modifying Term "AND" : 40% to 50% of the minor grain size "SOME" : 10% to 40% "TRACE" : 10% or less  5. Minor Grain Size (s) 6. Other (moisture content - dry, moist, wet; plasticity, etc.)	Compon	Distinguishing Features													
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<ol> <li>Color</li> <li>Major Grain Size - Composes more than 50% of the sample</li> <li>Modifying Term "AND": 40% to 50% of the minor grain size         "SOME": 10% to 40%</li></ol>		Order of Description													
	2. 3. 1 4. 1	r Grain Size - Composes more than 50% of the sample fying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less r Grain Size (s)													

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

(3)

(5)

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(1% - 10%)

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ĺ	Boran	ng Loc	ation												_	Type of Boring: S			Drilling Mud Type:		
		-							رهن							Cosing Used: SOUID	Sizes	115-2	NIA		
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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>

## **Order of Description**

1.	Soil Density (or co	nsistency) - Lo	ose, Sti	iff, Compact, Hard, etc.
2.	Color	• ·		·
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6	Other (moisture co	ntent - dry mo	ist wet	: plasticity, etc.)

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rwe														Ground Elevation: Weather: CLEAR					
ote														Inspector: THORNTON Operator: KINGSLEY   HUGHE					
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#### **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

#### Order of Description

1.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.
^	a.

- 2. Color
- 3. Major Grain Size Composes more than 50% of the sample

4. Modifying Term "AND": 40% to 50% of the minor grain size

"SOME" : 10% to 40% "TRACE" : 10% or less

- 5. Minor Grain Size (s)
- 6. Other (moisture content dry, moist, wet; plasticity, etc.)

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	·
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	iose, Si	iff, Compact, Hard, etc.
2.	Color			
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
		"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		
6.	Other (moisture co	ntent - dry, mo	ist, wei	; plasticity, etc.)

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ıme												Ground Elevations Weathers CLOUDY				
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Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>

#### Order of Description

1.	Soil Density (o	r consistency) -	Loose, Stiff,	Compact,	Hard, etc
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- 2. Color
- 3. Major Grain Size Composes more than 50% of the sample

4. Modifying Term "AND": 40% to 50% of the minor grain size

"SOME" : 10% to 40% "TRACE" : 10% or less

- 5. Minor Grain Size (s)
- 6. Other (moisture content dry, moist, wet: plasticity, etc.)

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-	Borin	a Loc	ation													Type of Borings SS		Drilling Mud Type
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# **Drilling and Sampling Symbols**

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	Order of Description
2. C	oil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. olor lajor Grain Size - Composes more than 50% of the sample
	lodifying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less
	linor Grain Size (s) ther (moisture content - dry, moist, wet: plasticity, etc.)
For examp	le:

(3)

(4)

(10% - 40%)

Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)

(4)

(1% - 10%)

(5) (6)

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,	W.			- <u> </u>						В	ORI	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY DIVISION				
1	Project Names PRA SHIL 502(1)							_	502	L()	Boring No. BL_4 Date: 8-1296 Sheet 1 of 1						
1		Boring Locations									Type of Boring: SS Drilling Mud Type:						
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•	ıme					-							Ground Elevation: Weather: CLOUDY				
	)ate												Inspector: HORDTON Operator: KINGLEY HUGHES				
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1	San, to Number	Sample Type	Depth	(Hetera)	Total Langua of Recovered Sample	Pooket Penetromet	Kg/cm2 Torvane	Kg/om2	No. of Blous on Sampler	for 158a Incremen	Depth (Heters)	Elevetion (Meters )	DESCRIPTION				
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SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

Distinguishing Features

PA: Power Auger Sample

Component

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Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>					
Clay  1. Lumps are comparatively hard when air-dried. 2. Threads (3mm diameter) of considerable length will support their own weight wend. 3. A moist pat will appear the same whether shaken in the palm of the hand or square.						
2. C 3. M	Order of Description  oil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. olor  lajor Grain Size - Composes more than 50% of the sample  lodifying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less					
	linor Grain Size (s) ther (moisture content - dry, moist, wet: plasticity, etc.)					
For examp	le:					
М	(1) (2) (3) (4) (5) (4) (5) (6) redium dense, reddish brown SILT, some fine sand, trace of clay (moist)  (10% - 40%) (1% - 10%)					

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							BC	RI	NG	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION / EASTERN FEDERAL LANDS HIGHWAY DIVISION
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Boris	ng Loc		.4.63							Type of Boring:
	,		مصا	121	_A	ni ac	6	Casing Used: HSA Size: 1-11.5 N/A		
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Liwe										Ground Elevation: Weather: CLEAR
Date										Inspectors Thoraton Operators KNGLEY HUGH
		ے ف	5 0	3	• 01	one s	)te	-	8 7	Hammer Weight 63.5 +/- 1kg
Sample	Sample	Depth From1	Total Lengt of Regovers Sample	Pooket Penetrome Kg/cm2	Torvana Kg/on2	No. of Blow on Sample for 158mm	Incremen	Depth (Heters)	Elevetion (Hetere )	DESCRIPTION
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Silt	Lumps are easily crumbled when are-dried.     Feels gritty between the teeth.
•	<ol> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.</li> <li>When squeezed it will appear dry and dull.</li> </ol>
Clay	1. Lumps are comparatively hard when air-dried.
	2. Threads (3mm diameter) of considerable length will support their own weight when held by one end.
	3. A moist pat will appear the same whether shaken in the palm of the hand or squeezed.
	Order of Description

#### Order of Description

2.	Color	-		
3.	Major Grain Size -	Composes mo	re than	50% of the sample
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size
	, ,	"SOME"	:	10% to 40%
		"TRACE"	:	10% or less
5.	Minor Grain Size (	s)		

Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc.

Other (moisture content - dry, moist, wet; plasticity, etc.)

For example:

1.

6.

	BORING								В	U. S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION / EASTERN FEDERAL LANDS HIGHWAY DIVISION		
Proje	ect No	wei		PRA	\	SI	411	50	<u> </u>	(1)		Boring No. 7-0-1 Date: 8-7-96. Sheet \ of \
Borin	Boring Locations PEACH ORCHARD							-		Type of Boring: SS Orilling Mud Type:		
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Time												Ground Elevations Weathers CLERE
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Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

1.	Soil Density (or co	nsistency) - Lo	ose, Sti	ff, Compact, Hard, etc.						
2.	Color			•						
3.	Major Grain Size -	Composes mo	re than	50% of the sample						
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size						
		"SOME"	:	10% to 40%						
		"TRACE"	:	10% or less						
5.	Minor Grain Size (	s)								
6.	Other (moisture content - dry moist, wet; plasticity, etc.)									

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2.	Color								
3.	Major Grain Size -	Composes mo	re than	50% of the sample					
4.	Modifying Term	"AND"	:	40% to 50% of the minor grain size					
		"SOME"	:	10% to 40%					
		"TRACE"	:	10% or less					
5.	Minor Grain Size (	s)							
6.	Other (moisture content - dry, moist, wet; plasticity, etc.)								

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#### VISUAL METHODS FOR SOILS CLASSIFICATION

Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel	
Coarse	25mm to 75mm
Medium	9.5mm to 25mm
Fine	2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	1. Lumps are easily crumbled when are-dried. 2. Facility between the treeth.
	2. Feels gritty between the teeth.
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## **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

## VISUAL METHODS FOR SOILS CLASSIFICATION

Compo	nent Distinguishing Features									
Boulde	rs Larger than 75mm									
Gravel Coars Media Fine										
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).									
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>									
Clay	<ol> <li>Eumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>									
	Order of Description									
1. 2.	Soil Density (or consistency) - Loose, Stiff, Compact, Hard, etc. Color									
3. 4.	Major Grain Size - Composes more than 50% of the sample  Modifying Term "AND": 40% to 50% of the minor grain size  "SOME": 10% to 40%  "TRACE": 10% or less									
5.	Minor Grain Size (s)									
6.	Other (moisture content - dry, moist, wet: plasticity, etc.)									
For exa	nple:									
	(1) (2) (3) (4) (5) (4) (5) (6) Medium dense, reddish brown SILT, some fine sand, trace of clay (moist)									
	(10% - 40%) $(1% - 10%)$									

FORM: F	HWA-15-6	2M (Rev.	)-96 <u>)</u>											IN	٦C	U. S. DEPARTMENT OF TRANSPORTATION FEOGRAL, HIGHWAY ADMINISTRATION A EASTERN FEDERAL LANDS HIGHWAY DIVISION				
Proj	oct No	met C			-									T 1	10	Boring No. 45 - 6 Date: 8-8-96 Sheet \ of \				
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Boru	ng Loc	ation	126	'h-	V C	S)	R	<u>.</u>	,	SA	40,		461	4	EL	Casing Used: 60L10 Size: 112-5 NIA				
ate	r Leve	1														Boring Began: 8-8-96 Completed: 8-8-96				
Fime																Ground Elevation: Weather: CLEAR				
Jate					••••										•	Inspector: WORDTON Operator: KINGSLET   HUME				
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#### **GENERAL NOTES**

#### **Drilling and Sampling Symbols**

SS: Split Spoon - 34.9mm I.D., 50mm O.D., except where noted

ST: Shelby Tube - 50mm O.D., except where noted

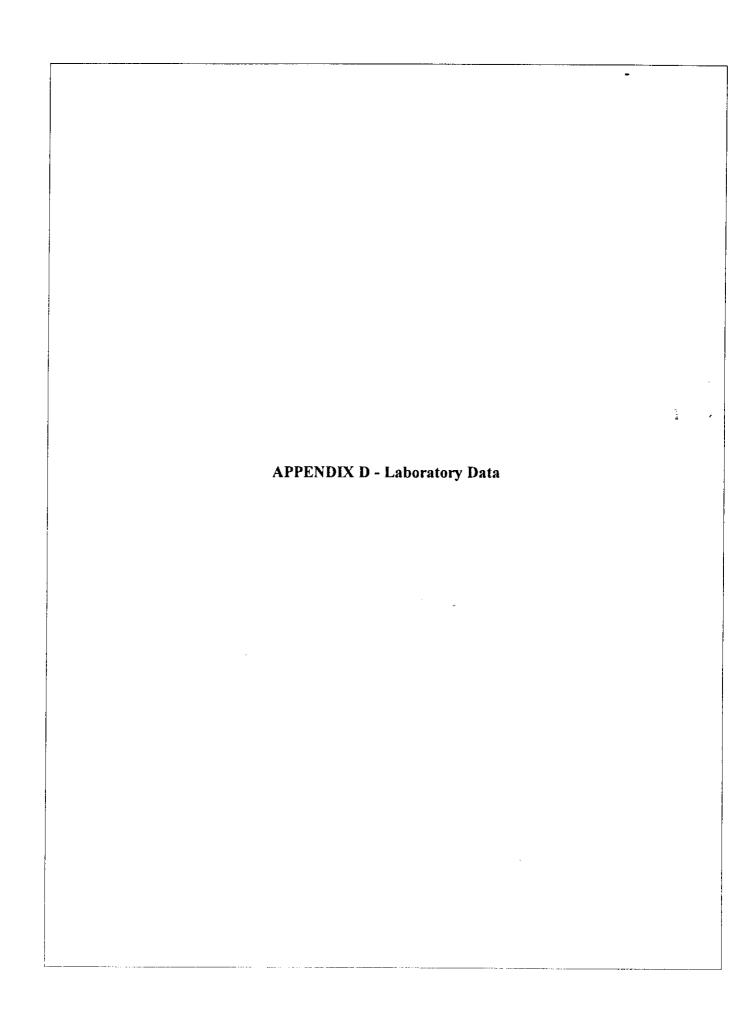
PA: Power Auger Sample

Water levels indicated on the boring logs are the levels measured in the boring at the times indicated. In pervious soils, the indicated elevations are considered reliable ground water levels. In impervious soils, the accurate determination of ground water elevations is not possible in even several days, and additional evidence on ground water elevations must be sought.

#### VISUAL METHODS FOR SOILS CLASSIFICATION

	VEGAL WETHOUS FOR SOILS CLASSIFICATION
Component	Distinguishing Features
Boulders	Larger than 75mm
Gravel Coarse Medium Fine	25mm to 75mm 9.5mm to 25mm 2.0mm to 9.5mm
Sand	The finest sand grains are just visible to the naked eye, while the largest would pass a 2.0mm sieve (pinhead size).
Silt	<ol> <li>Lumps are easily crumbled when are-dried.</li> <li>Feels gritty between the teeth.</li> <li>A moist pat when shaken in the palm of the hand will appear shiny and wet.         When squeezed it will appear dry and dull.</li> </ol>
Clay	<ol> <li>Lumps are comparatively hard when air-dried.</li> <li>Threads (3mm diameter) of considerable length will support their own weight when held by one end.</li> <li>A moist pat will appear the same whether shaken in the palm of the hand or squeezed.</li> </ol>
	Order of Description

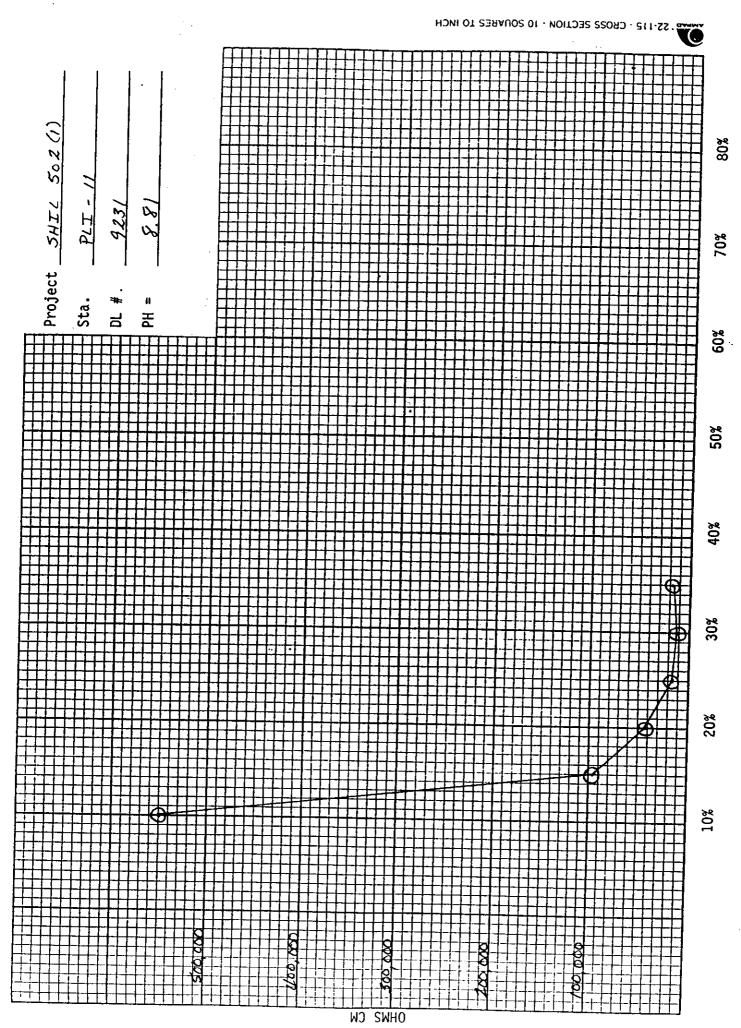
1. 2. 3.	Soil Density (or cons Color Major Grain Size - C	•		f, Compact, Hard, etc.
4.	Modifying Term	"AND" "SOME" "TRACE"	: : :	40% to 50% of the minor grain size 10% to 40% 10% or less
5. 6.	Minor Grain Size (s) Other (moisture cont		st, wet; p	plasticity, etc.)
For exam	nple:			



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REPORT ON SAMPLES	OF	AR SAME	125	· · · · · · · · · · · · · · · · · · ·		De	ATE: [-1	4-97
	·							
STATE: TW		PROJE	On	IL SO	2 (1)			
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SUBMITTED BY: W	ILL BASS					- · · · · · · · · · · · · · · · · · · ·		
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1 1/2 INCH SIEVE -	<b>———</b>							
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3/4-INCH SIEVE				100	100			
3/8-INCH SIEVE	ļ			90	94			
#4 SIEVE(4.7mm)	700			82	83	100	100	
#10 SIEVE(/2.0mm)-	77			75	69	99	99	
#40 SIEVE(0.42mm)-	<del></del>			67	56	98	99	
#200 SIEVE(0.074mm	60.7		1	50.3	40.7	78.7	85.0	1
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0.005mm			·		·			<del> </del>
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IQUID LIMIT (LL)	39			3		18.6	17.2	
PLASTICITY INDEX (PI)	22			38	*	38	34	
CLASSIFICATION	A-6 (11)			12	<del>*</del>	15	_17	

REMARKS: \* Not anough moterial to perform test.

REPORTED BY: Chis Johnson



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#4 SIEVE(4.7mm)			74	73	100	100		
#10 SIEVE(/2.0mm)-	100		61	61	100	99		<u> </u>
#40 SIEVE(0.42mm)~			52	51	100	98		
	- '&	  - <del></del>	43	43	99	97		
#200 SIEVE(0.074mm	82.6	 	25.5	27.3	840	69.4		
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FIELD #	5-1/5-1								_
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FIELD #	VE-1/J-1	AC-5/	VC-3/ J-2	VC-4/5-1	9243 vc·9/ J-/		<del> </del>	
STATION #		1	1	737	- <del> </del>			
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.9-1.5	0.3-0.9	0 2 - 0 4			
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#4 SIEVE(4.7mm)	<del> </del>	<del> </del>	92	<del></del>		<del></del>		
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% SMALLER THAN :	87.8		64.7	<del> </del>	85.3	<del> </del>		
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OISTURE	<del></del>							
CONTENT %	18.7	19.8	16.5	19.0	20.0			
IQUID LIMIT (LL)	34		34		40			
LASTICITY INDEX (PI)	16		18		21			
LASSIFICATION	A-6(13)		2-1 (9)		<u></u> 1	<del></del>	<del>-</del>	

REPORTED BY: Chi John

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FIELD #	9245 CP-1/ J-1	9246 CP-2/3-1	9247 CP-3/	9248 CP4/	92 49 CP-5/	9250 CP-6/	9251	9252
STATION #	/3-/	1 /2-1	75-1	CA 4/2-1	3-1	Z		CP.7/ 3-4
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% SMALLER THAN :	) 87. <del>5</del>	<b></b>	77.8		8811	· ·	50.3	59.2
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10ISTURE CONTENT %	19.4	21.0	11 (	71.6				
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PLASTICITY INDEX (PI)	15				35	·	2.1	21
LASSIFICATION	A-6 (13)		15		15		N.P.	N.P
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REPORTED EY: Chi Johnson

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D.L. REPORT #	9253 CP-61	9254	9255	9256	9257	9258		
FIELD #	73-1	7-2		CP-10/ J-1	CP-11/ J-1	CP-12/	I	
STATION #								
ELEVATION\DEPTH	0.2-0.9	0.8-1.4	2.7-3.3	0.1-0.7	0.1-0.7	0-0.	5	
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3/8-INCH SIEVE		96	95	100	79	<del></del>	┪	
#4 SIEVE(4.7mm)	60	93	92	97	69	<del></del>	<del> </del>	<del>-</del>
#10 SIEVE(/2.0mm)-		91				*******	<u> </u>	
#40 SIEVE(0.42mm)-	<b></b>	87	89	96	63		<del>- </del>	
#200 SIEVE(0.074mm	<del>  70</del>		81	95	54	<del></del>	<del> </del>	<b></b>
% SMALLER THAN :	30.8	54.7	42.6	84.9	38.3		<u> </u>	
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MOISTURE CONTENT %								
_IQUID LIMIT (LL)	15.5	18.9	17.7	20.3	13.2	16.0		
	22	18	15	37	27			
PLASTICITY INDEX (PI)	6	N.P.	N.P.	17				
CLASSIFICATION	M-2-46)	p-46)	A-4(6)	A-6 (14)	9-6(1)			
MARKS.		<del></del>					L	

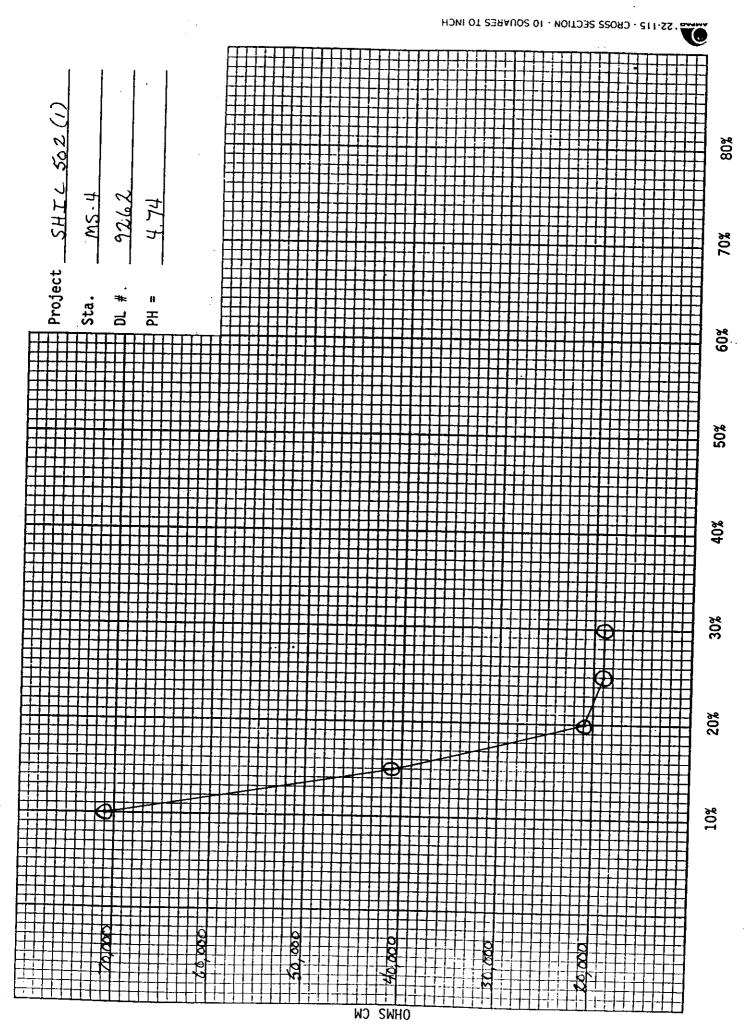
REPORTED BY: Chi John

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REPORT ON SAMPLES	OF -	JAR SAW	PIES			······································	DATE: 1-1	4-9 <b>7</b>
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ω	ILL BA		ITIFICA	TION	· · · · · · · · · · · · · · · · · · ·	<del></del>	<del></del>	<del></del>
D.L. REPORT #	T	<del></del>	1	<u> </u>	<del></del>	<del></del>	<del></del>	
FIELD #	9259 M5-1/	9260 ms-2/	9261 ns-3/ J-1	9262	115-5/			
STATION #	1 / 3-1	15-1	15-1	/5-1	75-1	<u> </u>		
ELEVATION\DEPTH		<del> </del>	<u> </u>		<del></del>			
	10.3-0.9	0.3-0.9	<u> 0.3-0.9</u>	2 0.3-0.9	10.3-0.9		<u> </u>	
MECHANICAL ANALYS		SIFICATI	ON 1E2	RESUL	rs			
% PASSING 2-INCH SIEVE		<u> </u>			<u> </u>	1		7
1 1/2 INCH SIEVE -	-					<del> </del>		
1-INCH SIEVE		1			<del> </del>	<del> </del>		
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3/8-INCH SIEVE				1.03	<del></del>	+		
#4 SIEVE(4.7mm)			100	100		<del> </del>		-
#10 SIEVE(/2.0mm)-	100	<del>                                     </del>	100			<del> </del>		<del>-</del>
#40 SIEVE(0.42mm)-		1	100	98	<del> </del>	<del> </del>		<del> </del>
#200 SIEVE(0.074mm		†		98	<del>                                     </del>	-		<del> </del>
% SMALLER THAN :	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		90.5	93.9	<del> </del>	<del>                                     </del>		1
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PROCTOR	<u> </u>			<u> </u>	<u> </u>	<u> </u>		
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C B R	<u>-</u>		<del></del> _					
10ISTURE CONTENT %	22.6	15.6	17.0	22.2	25.8			
IQUID LIMIT (LL)	32		38	39				
PLASTICITY INDEX (PI)	14		18	17				
CLASSIFICATION	A-6 (13)		4-4-(1-4)			_ <del></del>	_	<del> </del>

REPORTED BY: Chis Johnson



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REPORT ON SAMPLES	OF JAR	SAMPI	rs	<del></del>			DATE: 1-14-97		
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D.L. REPORT #	9264	9266			T	<u> </u>	<u> </u>	T	
FIELD #	R-1/5-1	R-3/J-/	<b> </b>	<del>                                     </del>	1		<del></del>		
STATION #					1				
ELEVATION\DEPTH	0.3-0.9	0.3-0.9							
			ON TEST	RESUL1	s				
MECHANICAL ANALYSI % PASSING	s						<del></del>	· · · · · · · · · · · · · · · · · · ·	
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1 1/2 INCH SIEVE -									
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#4 SIEVE(4.7mm)	100								
#10 SIEVE(/2.0mm)-	100	100		ļ	<u> </u>				
#40 SIEVE(0.42mm)-	<del></del>	99	·						
#200 SIEVE(0.074mm	79.4	85.4	<del></del>						
% SMALLER THAN :									
0.020mm									
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PROCTOR MAX. DENSITY						<u>.                                    </u>			
OPT. MOISTURE			<del> </del>						
C B R	1					L	<u> </u>	<b></b>	
MOISTURE CONTENT %									
IQUID LIMIT (LL)		17.2			·				
PLASTICITY		48							
CACCIFICATION	H-7-6(18) H	26							
TMACHEC 1	6(18/11	(-6(72)						1	

, REMARKS:

REPORTED EY: Chris Johnson

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REPORT ON SAMPLES							DATE:  -1	4-97
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D.L. REPORT #	9267	9268	9269	9270	927/		<u> </u>	
FIELD #	88-1/	88-1/		88-2	RS-1/	R-3-2/	_	
STATION #	1 23-4		1 - 3 - 3	73-6	3-1	1-2-	7	
ELEVATION\DEPTH	19-2.5	31-20	1 2-1 0	3 1-2 0				<del></del>
	CLAS	SIFICATI	1.2-1.9 ON TEST	RESULT	S	10.3-0.	9	
MECHANICAL ANALYSI						<del></del>	·	
% PASSING 2-INCH SIEVE						<del>                                     </del>	I	1
1 1/2 INCH SIEVE -	100			<b> </b>	<del> </del>	<del> </del>		<del> </del>
1-INCH SIEVE			100	<del> </del>	100			
3/4-INCH SIEVE	90	1	97		96			<del>-  </del>
3/8-INCH SIEVE	75		81	100	90		<del>- `-</del>	<del></del>
#4 SIEVE(4.7mm)	63		70	99	84	·	<del></del>	
#10 SIEVE(/2.0mm)-		100	61	9.4	78	100		<del></del>
#40 SIEVE(0.42mm)-		99	45	84	70	100		
#200 SIEVE(0.074mm		90.0	25.9	12.1	57.9	100		
% SMALLER THAN : 0.050mm			, , , , , , , , , , , , , , , , , , ,	, 2.,	3 1.7	73.0		
· 0.020mm						<del></del>		
0.005mm								
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PROCTOR MAX. DENSITY								
OPT. MOISTURE						···	<del>                                     </del>	-
C B R		<u> </u>				<del></del>		7
10ISTURE CONTENT %	9.6	38.0	17.0	72.4	16.3		1	
IQUID LIMIT (LL)	N.D.	71	27	22.0		22.2	<del></del>	
PLASTICITY INDEX (PI)	N.P	44	N. P.	N.D.	30	41		
CLASSIFICATION			A-2-4(0)			19		
MARKS.		D 1 6 C 3/	F-4-4(0)	H. 6. J (0)	4-6 (T) 1	A.7-6(20)	<u>И</u>	_1

REPORTED BY: Chi John

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REPORT ON SAMPLES	OS JA	e SAMP	IZ S				DATE: (-	14-97
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STATE: TN		PROJ	ECT: SH	IL 502	2 (1)	<del></del>		<del>"</del>
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SUBMITTED BY: WI	LL BAS	5 <i>E7</i> 7						
			VTIFICA	TION		····		<del></del>
D.L. REPORT #	9274	9275						
FIELD #	EC-1/7-1	EC-2/5-1	EC-3/ J-2					<b>—</b>
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9	0.9-1.5					<del></del>
				r RESUL	TS			
MECHANICAL ANALYSI % PASSING	S							
2-INCH SIEVE	•							
1 1/2 INCH SIEVE -								
1-INCH SIEVE						1		<del></del>
3/4-INCH SIEVE			100					<del> </del>
3/8-INCH SIEVE			9.8					
#4 SIEVE(4.7mm)			95			1		
#10 SIEVE(/2.0mm)-	100		93					
#40 SIEVE(0.42mm)-	99		91					<del> </del>
#200 SIEVE(0.074mm	87.9		68.0					
% SMALLER THAN :								
· 0.020mm	-							
0.005mm				<del> </del>				
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PROCTOR MAX. DENSITY				•		<u> </u>		
OPT. MOISTURE								
C B R					· · · · · · · · · · · · · · · · · · ·			<u> </u>
MOISTURE						! 		
CONTENT %	19.4	19.2	19.1					
LIQUID LIMIT (LL)	37		45			************		
PLASTICITY INDEX (PI)	_17		27					
CLASSIFICATION	A-6 (15)		A-7-6(16)			·		
FMARKS:		-			<u></u>	<del></del>		L

REPORTED EY: Chi Johnson

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MECHANICAL ANALYSI % PASSING 2-INCH SIEVE	s		7	<u> </u>	7			
1 1/2 INCH SIEVE -				<del></del>		-		
1-INCH SIEVE		7-77-71		<del></del>		<del>- </del>		<del></del>
3/4-INCH SIEVE			<del> </del>	<del> </del>		<del></del>		
3/8-INCH SIEVE								<del></del>
#4 SIEVE(4.7mm)	100	<del></del>		<del> </del>	<del> </del>	<del> </del>		<del> </del>
#10 SIEVE (/2.0mm)-	100			<del> </del>		<del> </del>		
#40 SIEVE(0.42mm)-	100			<del> </del>		<del> </del>	<del>- </del>	-
#200 SIEVE(0.074mm	89.4			<del> </del>	<del> </del>	<del> </del>		<del> </del>
% SMALLER THAN :	81.4					<del> </del>	1	-
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.0.002mm				<del> </del>	<del> </del>	<del> </del>	<del> </del>	<b> </b>
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PROCTOR				<u> </u>	<u> </u>			
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MOISTURE					·		<u> </u>	
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	36							
PLASTICITY INDEX (PI)	17			1				
	1-6(15)				-			
EMARKS:	-						<u> </u>	

REPORTED BY: Chi Johnson

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FIELD #	3-1/5-1					<del></del>		
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ELEVATION\DEPTH	0-0.6							
			ION TES	T RESUL	TS	<del></del>	_ <u></u>	_ <u></u>
MECHANICAL ANALYST	S		· · · · · · · · · · · · · · · · · · ·				<del></del>	<del></del>
% PASSING 2-INCH SIEVE	-	1			T .	. ]	1	
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1-INCH SIEVE	100					<del></del>		
3/4-INCH SIEVE			1			-	<del></del>	<del> </del>
3/8-INCH SIEVE				1	<del> </del>		<del> </del>	
#4 SIEVE(4.7mm)			1		<del> </del>	<del> </del>		<del> </del>
#10 SIEVE(/2.0mm)-				1	<del> </del>		<del> </del>	<del> </del>
#40 SIEVE(0.42mm)-			1	1	<del> </del>	<del></del>	<del> </del>	<del> </del>
#200 SIEVE(0.074mm			<del>                                     </del>	<del> </del>	<del> </del>	<del></del>	<del> </del>	
% SMALLER THAN:			<u> </u>	<del>                                     </del>			<del> </del>	
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MOISTURE CONTENT %	6.9	<del></del>						
LIQUID LIMIT (LL)	36					<b> </b>		·
PLASTICITY INDEX (PI)	N.P							
CLASSIFICATION	A-4(0)							

, REMARKS:

REFORTED EY: Ch. Johnson

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	U-S FE	. DEPAR DERAL H	TMENT ( IGHWAY	F TRANS ADMINIS	SPORTATI STRATION	1 [ON		
REPORT ON SAMPLES	OF JA	r Samp	ics	· · · · · · · · · · · · · · · · · · ·	<del></del>		DATE: (-	4-97
STATE: TN	<u> </u>	PROJE	ECT: SH	IL SUZ	<u> </u>		·····	· · · · · · · · · · · · · · · · · · ·
DATE CANCLED.	7-96			D FROM:				
CUDMITTED DU	ILL BA			· · · · · · · · · · · · · · · · · · ·	<del></del>	····		<del></del>
	<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>		VTIFICA	TION	<del></del>			<del></del>
D.L. REPORT #	9280	9281		.	7			
FIELD #	10-1/3-1	00-2/	<del>                                     </del>	1	<del></del>			-
STATION #	1 - 2 - 1	1 2-1		<del>-  </del>				
ELEVATION\DEPTH	0 3-0-9	0.3-0.9	1		-			
	CLASS			T RESUL	! TS	_ <u></u>		
MECHANICAL ANALYS % PASSING 2-INCH SIEVE	ıs	1		1		7		7
1 1/2 INCH SIEVE -	-	<del>                                     </del>	<del> </del>					<del></del>
1-INCH SIEVE	_	<del> </del>	<del> </del>			<del></del>		
3/4-INCH SIEVE	_	<del> </del>		<del>                                     </del>		<del>- </del>		<del> </del>
3/8-INCH SIEVE				<del> </del>	<del>- </del>			
#4 SIEVE(4.7mm)	100	<u> </u>	<del> </del>		<del></del>	<del> </del>	<del></del>	<del>                                     </del>
#10 SIEVE(/2.0mm)-				<del> </del>	<del>-</del>		<del></del>	
#40 SIEVE(0.42mm)-	100			<del>-</del>			<del> </del>	<del> </del>
#200 SIEVE(0.074mm			· · · · · ·	<del> </del>	<del> </del>	-		<del> </del>
% SMALLER THAN :	12.7					<del> </del>		
0.020mm					<del> </del>	<del> </del>		
0.005mm				<del> </del>		<del> </del>	-	· · · ·
0.002mm					<del> </del>	<del> </del> -	<del> </del>	
0.001mm				<del> </del>	<del> </del>		<del> </del>	
PROCTOR				<u> </u>		<u> </u>		<u> </u>
1AX. DENSITY								
OPT. MOISTURE								
- C B R	1				7	<u> </u>	T	,
OISTURE CONTENT %	22.9	18.9						
IQUID LIMIT (LL)	37	10.7					<del> </del>	
LASTICITY INDEX (PI)	18							
LASSIFICATION	9-(0(17)						<u> </u>	

REPORTED BY: Chi Johnson

	U.S FE	. DEPAR DERAL H	TMENT O	F TRANS ADMINIS	PORTATI TRATION	0N 1		
REPORT ON SAMPLES	OF 341	R SAMI	PIES				DATE:  -1	4-97
		7	·····		· · · · · · · · · · · · · · · · · · ·	•		
STATE: TN	<del></del>	PROJ		IL 502	(i)			
DATE SAMPLED: 8-5	3-96		SAMPLE	D FROM:	<del></del>	<del></del>		
SUBMITTED BY: W	ILL BAS				····			
		IDE	NTIFICA	TION	<del>- ,</del>			
D.L. REPORT #	9282	9283	<u> </u>					
FIELD #	BP-1/3-1	BA-2/J-1						
STATION #								
ELEVATION\DEPTH	0.3-0.9	0.3-0.9						
	CLASS	SIFICATI	ON TES	T RESUL	TS			
MECHANICAL ANALYS: % PASSING	rs							
2-INCH SIEVE	-				1			
1 1/2 INCH SIEVE -	-	-						1
1-INCH SIEVE	-					1		
3/4-INCH SIEVE	-	100			<del></del>		<del></del>	<del> </del>
3/8-INCH SIEVE		94	1		1			<del></del>
#4 SIEVE(4.7mm)	100	90	1			1	<del></del>	<del> </del>
#10 SIEVE(/2.0mm)-		86	<u> </u>		1	<del> </del>		-
#40 SIEVE(0.42mm)-		79		1	<del> </del>			<del> </del>
#200 SIEVE(0.074mm			1	<del> </del>		<del> </del>		
% SMALLER THAN :	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	69.1						
0.020mm					<del> </del>		<del>-  </del>	
0.005mm								
0.002mm						<del> </del>		
0.001mm				<u> </u>		<del>                                     </del>		
PROCTOR MAX. DENSITY				<u> </u>		' 		
OPT. MOISTURE				<del> </del>	<del> </del>			
		L		<u> </u>		L		<u> </u>
C B R								
MOISTURE CONTENT %	20.4	(5.7						
IQUID LIMIT (LL)	31	32						
PLASTICITY INDEX (PI)	N.P.	\3				-		
CLASSIFICATION	A-4 (1)	A-6(7)	<del></del>				<del>- </del>	
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REPORTED BY: Chi Johnson

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Project SHIL 502 (1) Sta. BP. 1 DL # 4282 PH = 4.52	
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	3-6
	30%
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<u>┟╁╬┾╀</u> ╃╫╀╫╂╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫╫	
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U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION									
REPORT ON SAMPLES OF JAR SAMPLE							DATE: 1-14-97		
THE GIVE BIY SHIRE ELG	Gi					•			
STATE: TN PROJECT: SHIL SOZ (1)									
DATE SAMPLED: 8-	9-96			D FROM:			-		
SUBMITTED BY: WI	ILL BASSE	77						<del></del>	
		IDEN	TIFICA	TION					
D.L. REPORT #	9284								
FIELD #	mo-1/5-1								
STATION #								<del> </del>	
ELEVATION\DEPTH	0.3-0.9								
		IFICATI	ON TES	T RESUL	TS		<del></del>	<u></u>	
MECHANICAL ANALYSI % PASSING	S							<del></del>	
2-INCH SIEVE							1	7	
1 1/2 INCH SIEVE -						<del></del>	1		
1-INCH SIEVE							<u> </u>		
3/4-INCH SIEVE								<del></del>	
3/8-INCH SIEVE						<u> </u>	<del> </del>		
#4 SIEVE(4.7mm)					<u> </u>		1		
#10 SIEVE(/2.0mm)-							<del>                                     </del>		
#40 SIEVE(0.42mm)-							<del>                                     </del>		
#200 SIEVE(0.074mm	}		7				1		
% SMALLER THAN : 0.050mm									
· 0.020mm			······································					<del> </del>	
0.005mm					<del> </del>	<del> </del>	<del>                                     </del>	<del> </del>	
.0.002mm				<del> </del> -	<del> </del>	<del> </del>	<del> </del>		
0.001mm			····	<del>                                     </del>		<del>                                     </del>	<del> </del>		
PROCTOR MAX. DENSITY				1	·	<u> </u>	<u> </u>	1	
OPT. MOISTURE			<del></del>	ļ					
	L			<u> </u>	l	Ĺ <u> </u>		<u> </u>	
C B R									
10ISTURE CONTENT %	12.0								
IQUID LIMIT (LL)						<del></del>		<b> </b>	
PLASTICITY INDEX (PI)									
CLASSIFICATION					-				
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REPORTED BY: Chi Johnan

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U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION											
REPORT ON SAMPLES	REPORT ON SAMPLES OF JAR SAMPLE'S DATE: 1-14-97										
STATE: TN	····	PROJE	CT: <1		<i>C</i> 1		·				
STATE: TN PROJECT: SHIL 502 (1)  DATE SAMPLED: 8-12-96 SAMPLED FROM:											
CUIDAT TECH											
IDENTIFICATION											
D 1 PERMOT #											
FIELD #	BL-1/5-1	9256	9288 BL-4/ J-1	9289 BL-5/							
STATION #	1-73-1	1 /3-1	73-1	/3-2							
ELEVATION\DEPTH	00.4	00.6	10-01				<del></del>				
		SIFICATI									
MECHANICAL ANALYSI							······································				
% PASSING 2-INCH SIEVE	-[					.		T			
1 1/2 INCH SIEVE -	-										
1-INCH SIEVE					1						
3/4-INCH SIEVE	100	100						<del>-</del>			
3/8-INCH SIEVE		97		1			<del>-  </del> -	<del></del>			
#4 SIEVE(4.7mm)	77	93				<del> </del>					
#10 SIEVE(/2.0mm)-	68	Go	100	100		<b>†</b>					
#40 SIEVE(0.42mm)-	52	86	91	98		<u> </u>					
#200 SIEVE(0.074mm		74.3	93.6	84.6	1	1					
% SMALLER THAN : 0.050mm											
0.020mm			<del></del>		1	<del> </del>					
0.005mm					1	┪		-			
0.002mm				<del>                                     </del>		<del> </del>					
0.001mm	*			<b> </b>	<del> </del>						
PROCTOR MAX. DENSITY				<u> </u>	·	<u> </u>					
OPT. MOISTURE		<del>  </del> -	<del></del>	<del> </del>				<del> </del>			
0.5.5		<u> </u>		·	I	<u> </u>					
CBR			· · · · · · · · · · · · · · · · · · ·								
	8.1	17.5	21.1	19.6							
.IQUID LIMIT (LL)	N.O.	32	34	36							
PLASTICITY INDEX (PI)	Ν.Ρ.	14	11	19							
1 ACCICIOATION		A-6 (9) A	1-6 (11)					1			

REPORTED EY: Chi Johnson

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION										
REPORT ON SAMPLES	<u>a</u>	DATE: 1-14-97								
STATE: TN	STATE: TN PROJECT: SHIL 502()									
BATE CAMELED	12-96			D FROM:	<del>``</del>					
CURMITTED DV.	WILL B	ASS ETT						<del></del>		
			TIFICA	TION	<del></del>	······································				
D.L. REPORT #	9290					1				
FIELD #	V-1/3-1					<del></del>		<del></del>		
STATION #										
ELEVATION\DEPTH	0-0.6							<b></b>		
		IFICATI	ON TES	T RESUL	rs					
MECHANICAL ANALYSI % PASSING 2-INCH SIEVE	s	1	7	1	7					
1 1/2 INCH SIEVE -		ļ	<del> </del>			ļ	<del> </del>			
1-INCH SIEVE		<del> </del>	<del> </del>		<del> </del>	ļ		<u> </u>		
3/4-INCH SIEVE	ļ		<del> </del>	-	<del>-                                    </del>					
3/8-INCH SIEVE			<del> </del>		<del></del>	ļ	<del> </del>			
#4 SIEVE(4.7mm)			<u> </u>	<del> </del>	<del> </del>		<del> </del>	<del> </del>		
#10 SIEVE(/2.0mm)-	100					<del> </del>	<del> </del>	·		
#40 SIEVE(0.42mm)-		<del> </del>	<b></b>	-	<del> </del>	<del> </del>	<del> </del>	<u> </u>		
#200 SIEVE(0.074mm	<del></del>			<del> </del>	<del> </del>	ļ	-	<del> </del>		
% SMALLER THAN :	85.0									
O.020mm					<del> </del> -		<u> </u>	<u> </u>		
0.005mm				<del> </del>			<del> </del>			
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0.001mm				<del> </del>		<u> </u>	ļ			
PROCTOR MAX. DENSITY			<del></del>	<u>.                                    </u>						
OPT. MOISTURE			<del></del>	<u> </u>		·				
or r. Horstone				<u> L</u>						
C B R							T	T		
MOISTURE CONTENT %	18.5		***************************************							
LIQUID LIMIT (LL)	32					-				
PLASTICITY INDEX (PI)	N,P									
CLASSIFICATION	A-4 ()									

REPORTED BY: Chi Johnson

E-96-0432
US DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

### Request for and Report of SOIL CLASSIFICATION TEST

PHOJECT SHIL 502(1)		PLI-3			
SOURCE		Y ITEM NO			
MATERIAL TO BE USED FOR			<del></del>		
SAMPLED BY		F	ROM		DATE
PERSON AUTHORIZING TEST		0	ATE SHIPPED	TO LAB	
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST RESULTS	SPECIFICATION
M AMOUNT FINER THAN	Т 11	10	E-96-043a	TO BE LISTED ON SIDE	THE REVERSE "
₹ SIEVE ANALYSIS	T 27	1123	11	TO BE LISTED ON SIDE	THE REVERSE
A FIGUID FIMIT	Т 89	1122 112	- 11	35 /	
DE PLASTIC LIMIT	Т 90	1122	u	17	
D PLASTIC INDEX	Т 90	1133	- 11	18 -	
TO CLASSIFICATION	T 317	1128	11	A-6(14)	
PARTICLE SIZE BY HYDROMETER	Т 88				
№ OTHER	T 99 C	1122	E-96-0432	Majk Den:117,4 % Moist:14,0	/
N OTHER	T193 1	24 2	//	CBR 7.2	

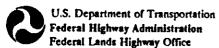
REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

Marcel W. Vivier FFI HD Materials Engineer

Reported by:

128197

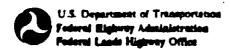
Date



Form FHWA 1625 (9-90)

## Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: SHIL 502(1)	)	Source:							
Where Sampled: Depth C	D-1,5m	Quantity Represented:							
Sample Of: SOIL		Lot No.: Sample No.: P/I-3							
Sampled By:	Date: 8/29/	96 Tested By: Tout A	town	Date: 1/1/97					
Method: T. 990 Max. Dry	Density: 117.4 -	Ootloum Moleture: /							
		Optimum Moisture: 14,090 Specific Gravity:							
Test No.  (a) Wet Soil + Tare  (b) Mold Tare  (c) [a-b] Wet Wt.	A	8	C	D					
(b) Mold Tare	6211	6264	6254	6203					
(c) [a-b] Wet Wt.	4242	4342	4242	4,34,2					
	130,52	133.8	1332	129.6					
Dry Density [ 1+.6 V ]	115.86	116.8	114.5	109,7					
A constant fact	or. Use 30.00 for	AASHTO T 99 and 19.33	for AASHTO T 180						
	C	G	E						
(r) Wet Soil Wt. + Tare	550,5	407.6	400.8	4586					
Pan No.  (r) Wet Soil Wt. + Tare  (s) Dry Soil Wt. + Tare  (t) Container Tare Wt.  (u) Dry Soil Wt. [s-t]	508.0	374,7	366.2	410.8					
(t) Container Tere Wt.	171.0	149.3	154,2	155.9					
	337.0	225.41	212.0	254.9					
(v) Water Wt. [r-s] (w) % Moisture [-v (100)]	12.5	32.9	34.6	47.8					
119	14167	11916 7	16,31	18.8					
Dry Density (lbs/ft³)	<i>y</i>		Na 2 177/3						
Dry D									
Fare Filling coop is not	12 14	<b>l</b> <i>G</i> Moisture (% of Dry W	18 á	10					



## WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

ropect SHIL 502(i)	Source							
here eampled	Quant	Quantity represented						
emple of Soil	Lot Mo		emple No. PLT					
empled By: Date:	Torond	Mattan	and Jan	0000 <u>1/22/</u> 0				
TEST		) UMIT	i	C LIMIT				
TEST NUMBER	1	2	1	2				
No. of blows (liquid limit test)	20	<i>a</i> 8						
Container No.	Al	AY	AIO	Ala				
A Tare weight of container	15.28	15,44	15,54	15.23				
8 Weight of wet soil and container	32,97	31.14	18,40	18.16				
C Weight of dry soil and container	28,30	27,14	17,99	17.71				
D Weight of dry soil (C - A)	13.02 -	11,70	a.45	a.48				
E Weight of moleture [8 - C]	4,67 -	-4,00	10.41	0.45				
F Percent moleture ( # (100) )	35,9	34.2-	16.7	18,1				
Uquid Limit	35.0	34,7	,					
		Plaste Limit <sup>2</sup> (F)	16.7	18.1				
G. LIQUID LIMIT	r (mean) 3	5/	-					
	н	. PLASTIC LIMIT (	(Mean)	17				
PLASTIC INDEX (G · H) [/8	<i>\rightarrow</i> .			ı ,				
	_		m d 1	WU -				
	•	LI M	arcei W. Y	ivici ds Ecgineer				

THE WEST COMMENTS TO THE WORKS

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E-96-0433

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

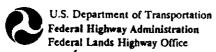
### Request for and Report of SOIL CLASSIFICATION TEST

PHOJECT OFFIC JUNE	<u></u>	<del> </del>	S	AMPLE NO	VC 6
SOURCE			PA	Y ITEM NO	
MATERIAL TO BE USED FOR				·	
SAMPLED BY		F	ROM Depth	0-2.1	DATE 8/29/96
PERSON AUTHORIZING TEST		O	ATE SHIPPED	TO LAB	
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST RESULTS	SPECIFICATION
M AMOUNT FINER THAN	Т 11	138	E-46-0433	TO BE LISTED ON SIDE	THE REVERSE "
N SIEVE ANALYSIS	T 27	1129	u	TO BE LISTED ON SIDE	THE REVERSE
TU LIQUID LIMIT	Т 89.	1/30	И	48	
TO PLASTIC LIMIT	Т 90	130 1	11	19 -	/
PLASTIC INDEX	Т 90	130 10	11	29	
CLASSIFICATION	Т 317	311892	u	A-7-6(z2	
PARTICLE SIZE BY HYDROMETER	Т 88				
Ò OTHER	T 99 C	123	E-96-0433	Density: 113,9 Mostwe: 16,3	
N OTHER	T193	10	"	CBR 5.9	

REMARKS: Forward original copy to Regional Lab Forward one copy with sample Retain one copy in Project records

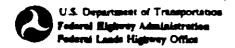
> Marcel W. Viviar HEIID Materials Engineer

Reported by: Mathanail Name Name



# Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

P	roject: SHIL	502(1)			Source	):			<del></del>				
W	here Sampled: $\overline{f 1}$	<del>epth</del>	<u>0- 2.1</u>		Quanti	Quantity Represented:							
S	ample Of: <u>501</u>	<u></u>	· · · · · · · · · · · · · · · · · · ·	·		Lot No.: Sample No.: VC-6							
S	ampled By:		Date:	<i>8 8</i> 9 9	G Tested	By: Nethane	el De	<u> </u>	Date: 1/23	3/9-			
М	ethod:T 99C				Optimum I	Moisture: 16.3	s	pecific Gravi	•	<b>-</b> '			
Determination	Test No.				a		.3	<del> </del>		$\neg$			
å,	(a) Wet Soil		6114		6202		5248	<u>-</u>	6232	7			
į	(b) Mold Tar		4242		4242		4242		4242	7			
Det	(c) [a-b] We		4:13		14,32		4.48		4.39				
t'y	(d) Wet Dens	ity (*)c lb/ft 3	123.9-	<u> </u>	144.6	1 /	32.61		1317	7			
Density	Dry Density[		109.8		112.7		13,8-		11110				
Ā	* A	constant fact	or. Use 30	0.00 for AA	SE I OTHE	and 13.33 for	r AASHTO	T 180.					
Lo	Pan No.				16	<del>                                     </del>	IE.		1C	7			
Determination	(r) Wet Soil		571.0	,	486.G	1	150.4	<del></del>	707 3	-			
Ē	(s) Dry Soil		5235		44A.G		08.4		2500	7			
ete.	(t) Container		1761		149.2	1	54,1	· · · · · · · · · · · · · · · · · · ·	155 9	7			
	(u) Dry Soll		352.4		293.4	á	54.3		203.3	7—			
Į.	(v) Water Wt.		47,5		44.0		420	_	38.1 -	<b>}</b>			
Moisture	(w) % Moistur	e [ - (100) ]	13.5		15.0		16.51		18.7	1			
æ	114	1 2 2 2 2 2 2	- r		<u> </u>	<u> </u>				_			
;	. 113 -									1			
	112-			/\$/									
	Dry Density (lbs/ft <sup>3</sup>								\ >				
	Dry Densi	/					-00	ı a					
									a Cir Circlination				
	1	3	14	15	Moisture	(% of Dry Weigh	17	18		19			



## WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project SHIL 502(1)	Source	1		
More sampled Depth 0-2.1	Quanti	ty represented		
Sample of Soil	Lot No	S4	umple No. <u>VC</u>	-6
Sempled By: Dets: 8/29/0	- 26 Tooled	or Mathons	0	- 1/30
		7		
TEST	LIQUK	UMIT	PLASTI	C UMIT
		<b>L</b> )	(1	<b>L)</b>
TEST NUMBER	1	2	1	2
No. of blows (liquid limit test)	2.5	26		
Container No.	A3	A4	Ala	AI3
A Tare weight of container	15.69	15.42	15.23	15,73
8 Weight of wet soil and container	34,35	32,25	19.25	20,14
C Weight of dry soil and container	28.30	26.83	18,60	19.43
D Weight of dry soil (C - A)	12.61-	-11.41 -	3.37	3.70
E Weight of moleture [B - C]	6.05	5.42	0,65-	10,71
F Percent moisture (# (100))	48.0	47.8	19.3 -	19,2
Liquid Limit <sup>1</sup>	48,0	480		
		47.7	·	
		Pleasto Limit <sup>a</sup> [F]	19.3	19.2
G. LIQUID LIMIT (A	neen) 40	8,0		
	H.	PLASTIC LIMIT (I	Mean)	19
PLASTIC INDEX (G - H) 29				
* torrest		<del>-</del>	m & A Marcel W.	Just _
Disagrand using numericate shart. See "Produter" statement in AASHTO. See "Produter" statement in AASHTO 7 80.	T 66.		Marcel W. TLHD Mate	Vivier rials Engine

Form FI-NAL 1984 (B-85)

% Moistuke

1 1

FENETRATION (EXCHES)

STHICKE ACCOMED TO 1 NOW HEAVY

E-96-0434

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

## Request for and Report of SOIL CLASSIFICATION TEST

PHOJECT SHIL 502(1)		· · · · · · · · · · · · · · · · · · ·		SAMPLE NO.	R-2
SOURCE				Y ITEM NO.	
MATERIAL TO BE USED FOR					
SAMPLED BY	<del></del>	F	ROM		DATE 8/29/96
PERSON AUTHORIZING TEST	<del>- ` ; ;</del>	0	ATE SHIPPED	TO LAB	
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST MESULTS	SPECIFICATION
M 0.075 mm	T 11	2/2/197	E-96-0434	TO BE LISTED ON SIDE	THE REVERSE "
N SIEVE ANALYSIS	Т 27	225 110	11	TO BE LISTED ON SIDE	THE REVERSE
Q LIQUID LIMIT	Т 89	2124 719	11	50 ,	
D PLASTIC LIMIT	T 90	2/24/10	<i>, 'I</i>	24 '	/
V PLASTIC INDEX	T 90	alay	1	26	
CLASSIFICATION	T 317	3 3 97	, ,	A-7-6(7)	
PARTICLE SIZE BY HYDROMETER	T 88	)			• \
S OTHER	T99 C	2/24	E-4-0434	max. Density:117,6 opt. moist,13,	8 /
X OTHER	T193	10	11	CBR 7.5-	

REMARKS: Forward original copy to Regional Lab

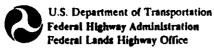
Forward one copy with sample Retain one copy in Project records

m. of Juin
Hancol W. VIVICE
LHD Materials Engineer

Reported by: Hat hande Name

3/4/97

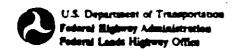
Date



Form FHWA 1625 (9-90)

# Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Pr	roject: SHIL 502(1)	)	Source	:		
W	here Sampled:		Quanti	ty Represented:		
Sa	imple Of: SOIL		Let No	.: s	ample No.: R-	-2
Şa	impled By:	Date: E	3/29/96 Tested	By: Nothans	Dan 1	10 212419
14.	ethod: <u>199 C</u> Max. Dry	0		128	7	<u>'ata 1</u> + ,
	ethod: 177C Max. Dry	Density: 10 (10)	Optimum	Moisture: <u>13,8</u>	Specific Gravit	λ:
Determination	Test No.	1 1 1	1 2	1 3		
9	(a) Wet Soil + Tare	6176	6268	626	29	6214
Ē	(b) Mold Tare	4242	4242	424		4242
ţ	(c) [a-b] Wet Wt.	4.26 1	4.47	4.4	7-1	4.35
	(d) Wet Density (*)c lb/ft 3	127.81	134,1-	134.	11	130.5
Density	Dry Density[ 1+	114,43	117.5.	115;	7	110.4
		tor. Use 30.00	for AASHTO T 99	and 13.33 for AAS	HTO T 180.	h <del>ui</del>
Determination	Pan No.	IE	C	IG <sub>t</sub>		IC
a d	(r) Wet Soil Wt. + Tare	671.9	677.0	515.		617.5
Ē	(s) Dry Soil Wt. + Tare	617.3	526.9	465,		546,3
ë	(t) Container Tare Wt.	154,8	171.2	149		155,9
	(u) Dry Soil Wt. [s-t]	403.1	355, 7-	3/G	a /	390.4
Ĭ	(v) Water Wt. [r-s]	54,61	60.1	50,	4	7/12
Moisture	(w) % Moisture [-7 (100)]	11.8	1401	15,0	7.1	18.2
×	120		. // <del>//////////////////////////////////</del>			
	Dry Density (lbs/ft³)	m ak				
	110				······································	<u>:                                    </u>
	9	H	13 15	(% of Dry Weight)	19	त्री



## WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project 5HIL 502(1)	0			
Mere sampled	Source		····	
sample of Soil		ty represented	emple No. R-	2
Sampled By: Dess: 82°	9/96 10000	or Hatham	Dm.	0000 <u>Z/</u> Z
TEST	uquid			C LIMIT
TEST NUMBER	1	2	1	2
No. of blows (figuid limit test)	20	22		i /
Container No.	Al	AIO	A6	Ala
A Tere weight of container	15,28	15.55	15,43	15,24
8 Weight of wet soil and container	33,35	33.21	18,87	19.0°
C Weight of dry soil and container	27,28	27,27	18,24	18.31
D Weight of dry soll [C - A]	11.94	11,72	2.81	3,07
E Weight of moisture [B - C]	6.13-	5,94"	0.63	0.78
F Percent moleture ( E (100) )	51.3	50.7-	122.4-	25.4
Uquid Umit	50.0	49,9		
	ı	Messic Umit <sup>3</sup> (F)	22,4	25.4
G. LIQUID LIMI	T (moun) 3	0		
	н	PLASTIC LIMIT (	Mean)	24.
PLASTIC INDEX (G · H)		0	n al Nu	ûs
			rcel W. Vi	vier s Logisans

7.7				Ho 115 160 As Moldeb	17.6 PC6)= 111-7 PC6 0.1= 7.0 84 = 7.6
13.4 22.0 14.0 21.0				96 100 105 DRY NEWSITY	
A 25 BLOWS  A 26 BLOWS	7.7	© У#7 ¥3× 113	<b>V</b> <i>Q</i> <b>S</b>	C6R 60 01 2 600	C6X 80 102-117
	A Ling in the control of the control				\$3 <b>6</b>
		0.7 = 11.0	CBR 69 911 = 13.6		CSK & V.1 = 5.0
No: K-2 No: K-2 No: K-2		@ W	80		
SAMPLE NO: R	007	(50)	(35) (20) 48		9 00

90 MOISTURE

PENETRATION (ENCHES)

ANNON TO COLNERS ON HER

E-96-0435

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

#### Request for and Report of SOIL CLASSIFICATION TEST

THOJECT SHIL SOULD			·	SAMPLE NO.	<u>KS-3</u>
SOURCE			P.	AY ITEM NO.	
MATERIAL TO BE USED FOR		-	· · · · · · · · · · · · · · · · · · ·		
SAMPLED BY		F	ROM PEPIL:	0-1.8	DATE 10/18/96
PERSON AUTHORIZING TEST					
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST RESULTS	SPECIFICATION
AMOUNT FINER THAN	T 11	116	E-96-0435	TO BE LISTED ON SIDE	THE REVERSE
SIEVE ANALYSIS	T 27	11 1	"	SIDE	THE REVERSE
A FIGORD FIMIT	T 89	118	"	29 -	_
PLASTIC LIMIT	T 90	118	"	18 -	/
PLASTIC INDEX	Т 90	118	"	11 -	
CLASSIFICATION	Т 317	1122	"	A-6(8)	
PARTICLE SIZE BY HYDROMETER	т 88				
Z OTHER	799C	9/18	E-94-0435	Max! Dosity:115,3 & Most:15.8	
OTHER	T193	1113	"	CBR 7.8	/
		<del>( ( )</del>	<del></del>	<del></del>	<u> </u>

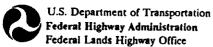
REMARKS: Forward original copy to Regional Lab
Forward one copy with sample
Retain one copy in Project records

M. of Nover Marcel W. Vivier Materials Engineer

Reported by: Mathauai Name

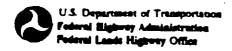
1/22/97

Date



#### Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

Project: 5HIL 502(1)		Source:		
Where Sampled:		Quantity	/ Represented:	
Sample Of:		•		mple No.: <u>R5-3</u> Date: 1/6/6
Sampled By:	Date: 101	18/96 Tested E	v. Mothers.	Da Day 1/4/6
Method: 7990 Max. Dry	0 115 3		15.05	Date: 10/
	Density: <u>ノル</u>	Optimum M	loisture: <u>15,85</u> .	Specific Gravity:
Test No.  (a) Wet Soil + Tare  (b) Mold Tare  (c) [a-b] Wet Wt.		P		
g (a) Wet Soil + Tare	6226	8263	<u>C</u>	$\frac{D}{a}$
(b) Mold Tare	4242	42.42	618	
(c) [a-b] Wet Wt.	11.37	11 40	42.42	
(d) Wet Density (*)c lb/ft 3	131.1	133.8	128	
Dry Density[ 1 + 01	1145	115-2	100	
(d) wet Density (*)c lb/ft <sup>3</sup> Dry Density [ d	or 1700 20 00	1 AASIMO E 00	1000	5+ 108.0-
	or. Use 30.00	IOT AASHTU T 99 (	and 19.33 for AASH	TO T 180.
Pan No.	1 <i>G</i> <sub>2</sub>	IE	IC	1 10
(r) Wet Soil Wt. + Tare	633./	767.6	584.	5 650,9
(s) Dry Soil Wt. + Tere	571.8 149.2	683.0	517,8	567.2
Pan No.  (r) Wet Soil Wt. + Tare  (s) Dry Soil Wt. + Tare  (t) Container Tare Wt.  (u) Dry Soil Wt. [s-t]	149,2	154,2	155,0	149,3
	422.6	528,81	361.3	417.9.
(v) Water Wt. [r-s]	613	84.61	67.3	83,7
(v) Water Wt. [r-s] (w) % Moisture [-v/u (100)]	14.5	16.0	18.6	20,0
<del></del>				
117	9		<u>M</u> .	A North
Dry Density (lbs/ft³)	4			Matarius Englieur
108				
105 12 rm FHWA 1625 (9-90)	14	16 18 Moisture (%	20 6 of Dry Weight)	22



# WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

Project 5HIL 502(1)	Source	×		
Where sampled		tity represented		
iemple of	Lot N	o S	emple No. R	5-3
Sampled By: Dese: 10	118/96	o by Hethans	1	Date 1/8/9
TEST		D UMIT	PLASTI	
TEST NUMBER	1	2	1	2
No. of blows (liquid limit test)	22	30		
Container No.	AU	Al	A10	All
A Tare weight of container	15,45	15,28	15,54	15,09
B Weight of wet soil and container	30,39	31.94	20,22	19,37
C Weight of dry soil and container	26,97	28,20	19.53	18,70
Weight of dry solf [C - A]	11,52.	12,92	- 3,99 -	- 3.61 -
Weight of moisture [8 - C]	3.42	3,74-	0.69	0.67
Percent moisture [ E (100) ]	29.7	28.9	17.3	18,6
Uquid (	Limit 29, 3,	129,5-		
	<del></del>	Pleasie Limit <sup>2</sup> (F)	17,3	18,6
. G. MONIO	LIMIT (mean) 2	9	7"3	10,6
	н	. PLASTIC LIMIT (A	teen) /	8
PLASTIC INDEX [G · H] //	:		1	<del></del>
		P	m. ok. Na arcel W. V LHD Materi	livier
Majned using namegraph shart. See "President elatement in the "President elatement in AABATO 7 on	AASHTO T SS.		HIM Materi	de l'internation

Form FHWA 1884 (P-65

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STRILLNE ACCENTED, ICTS HEA

PENETRATION (INCHES)

E-96-0436
US DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

## Request for end Report of SOIL CLASSIFICATION TEST

PROJECT SHIL SOUCH	<u></u>			SAMPLE NO.	1-4		
SOURCE							
MATERIAL TO BE USED FOR				···			
SAMPLED BY		F	ROM		DATE 8/29/96		
PERSON AUTHORIZING TEST							
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST RESULTS	SPECIFICATION		
A AMOUNT FINER THAN	ТП	2/24/119	E-96-0436	TO BE LISTED ON SIDE	THE REVERSE		
SIEVE ANALYSIS	Т 27	2/25	"	TO BE LISTED ON 1 SIDE	THE REVERSE		
ע בופטוס נואוד	Т 89	2123	u	31			
PLASTIC LIMIT	Т 90	2 3 7	"	18			
PLASTIC INDEX	Т 90	21336	"	13	/		
CLASSIFICATION	T 317	2/26/10	11	A-7-6(8)			
PARTICLE SIZE BY HYDROMETER	T 88	10					
OTHER	7.99 C	0117	E-96-043G	Max Den: 123	3/		
OTHER	T193	2 23		CBR 6.5-			

M. d. N. Vivier

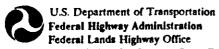
Motorials Engineer

Reported by:

1/26/97

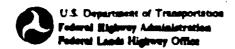
Date

Forward one copy with sample Retain one copy in Project records



#### Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

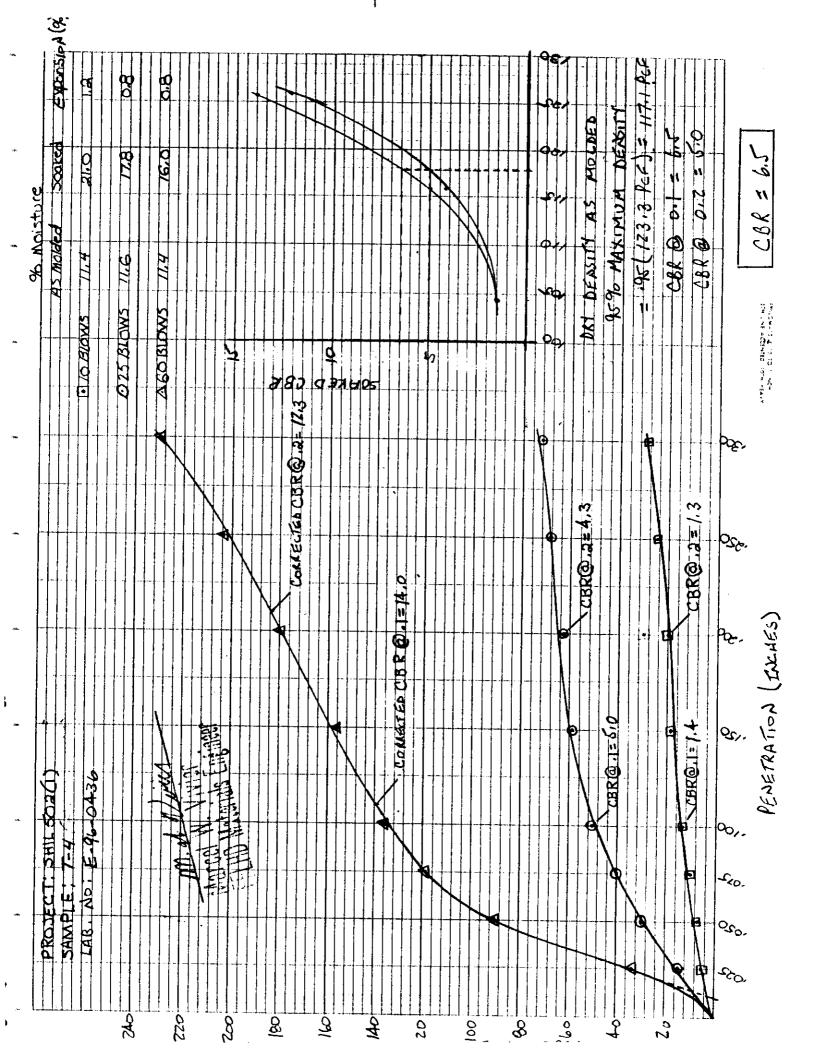
Pro	olect: SHIL 302(1)	)	Source:	· · · · · · · · · · · · · · · · · · ·		
Wh	ere Sampled:		Quantity	/ Represented:		
Sar	mple Of: 501 L		Lot No.:		Sample No.:	T-4
	npled By:	Date: 8/6	19/96 Tested 1	By: Methanal &	Dan	Date: 2/11/92
Ме	thod: T990 Max. Dry	Density: <u>123,3</u>	Optimum M	Aoisture: 113 -	Specific G	
00	Test No.	<u> </u>			2	
Determination	(a) Wet Soil + Tare	6235	6315	<del>                                     </del>	3 398	7 2 2 2 2 2 2
P I	(b) Mold Tare	4241	4241		141	6229
į	(c) [a-b] Wet Wt.	4,40	4,57-	4	53/	4241
	(d) Wet Density (*)c lb/ft 3	132,0	137.1		5,9	131.4
att	Dry Density[ d   1 + .61W ]	120,8	123.1-	11	9.6	113.6
Density	* A constant fact	or. Use 30.00 f	or AASHTO T 99	and 13.33 for	AASHTO T 180.	
Determination	Pan No.	A	IE		IG <sub>1</sub>	K.
net.	(r) Wet Soil Wt. + Tare	638.3	535,6	5	125	542,2
Ē	(s) Dry Soil Wt. + Tare	598,7	496.6		69.0	490,3
٤	(t) Container Tare Wt.	173,0	154.3		19.1	155,8
	(u) Dry Soil Wt. [s-t]	425.7	342.3	3/	9,9	334.5
7	(v) Water Wt. [r-s]	39.6	39.0 -	4	3.5	549
Moisture	(w) % Molature [-\frac{100}{4} (100)]	43/	11.4	[]	3.6	15.5
	126				of Diver	
	123				ikatar di 13. Marandika La	હો <i>હ</i> ું.
	(lbs/m³)					
	Dry Density (lbs/ft³)				\	
	114				Ø	
	9	10.5	A 13	3,5 (% of Dry Weight)	5 1	6.5



# WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

roper SHIL 502(1)	Source		<u> </u>	
here sampled		ty represented		
empte of SoiL	Lot No		emple No. 7-	4
empled By: Date: 8/29/		W Hallan	afta.	- o- 2/2°
			$\cup$	24-0
TEST		D UMIT S)		IC UMIT
TEST NUMBER	1	2	1	2
No. of blows (liquid limit test)	20	23		
Container No.	A4	All	A6	Al
A Tare weight of container	15,42	15,09	15,42	15.28
8 Weight of wet soil and container	38,55	38,19	20,89	19,39
C Weight of dry soil and container	33.01	32,73	19,54	18.75
D Weight of dry soft [C - A]	17,59	17.64	4.12	3,47
E Weight of moleture [8 - C]	5.54	5.46	0.75	10.64
F Percent moleture [ # (100) ]	31.5	31.0	18.2-	18.4
Liquid Limit <sup>†</sup>	30,7	30,7		
		Plastic Limit <sup>2</sup> [F]	18,2	18.4
G. LIQUID LIMIT	(mean) 3	31		
	Н	PLASTIC LIMIT	(Meen)	8
PLASTIC INDEX (G · H) 13			. 4	
			of Nivi	<u>.</u>
•		######################################	gi it. YiYi Nilata da 1	51 

Form PANA 1884 (#48)



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

### Request for end Report of SOIL CLASSIFICATION TEST

PHOJECT SHIL 500(1)	SAMPLE NO. BL-3				
SOURCE	PAY ITEM NO				
MATERIAL TO BE USED FOR				· · · · · · · · · · · · · · · · · · ·	
SAMPLED BY		F	ROM		DATE <u>8/29/9<b>6</b></u>
PERSON AUTHORIZING TEST		O.	ATE SHIPPED	TO LAB	
INDICATE EACH TEST TO BE RUN	TEST NO.	TESTED BY/DATE	LAS NO.	TEST RESULTS	SPECIFICATION
AMOUNT FINER THAN	T 11	211797	E-96-0437	TO BE LISTED ON SIDE	THE REVERSE "
N SIEVE ANALYSIS	Т 27	2118 70	"	TO BE LISTED ON SIDE	THE REVERSE
A LIQUID LIMIT	T 89	2118 7/9	"	25 -	/
D PLASTIC LIMIT	T 90	2118 119	. 11	19	
Q PLASTIC INDEX	T 90	2118 719	,	6	/
Q CLASSIFICATION	T 317	2/24 70	11	A-4(1)	
PARTICLE SIZE BY HYDROMETER	T 88	0.	÷		
N OTHER 199	C	2119	E-96-043T	Mex.Den;121. opt.Moistero.	7
N OTHER		2/20	:	CBR N.7	1

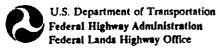
REMARKS: Forward original copy to Regional Lab

Forward one copy with sample Retain one copy in Project records

m of Nove model W. Vivier (11) Materials Engineer

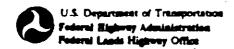
Reported by: Mattarae Name

Date



# Worksheet for Determining Moisture/Density Relationships AASHTO T 99 AND AASHTO T 180

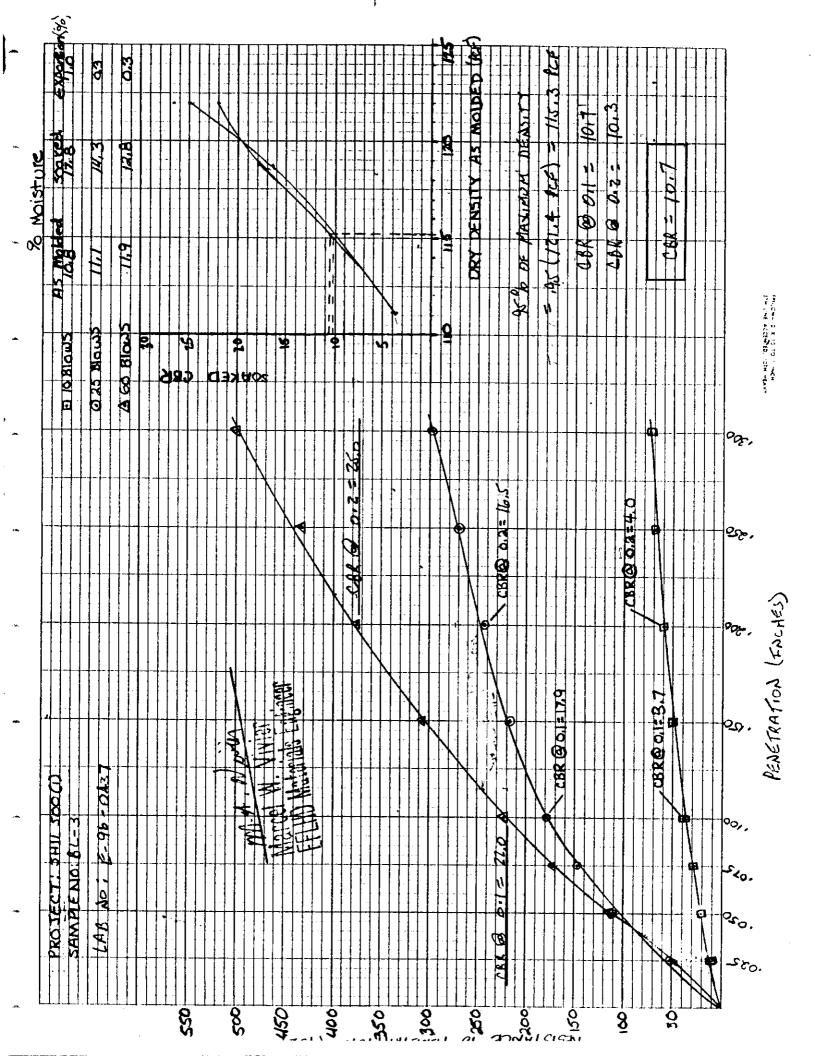
Project: 5HIL 500(1)		Source:		· · · · · · · · · · · · · · · · · · ·
Where Sampled:		Quantity Represented:		
Sample Of: SOIL	· · · · · · · · · · · · · · · · · · ·	Lot No.:	Sample No.: BL	-3
Sampled By:	Date: 8/29/9	G Tested By: Tathons	all Jans 1	nate: 1/29/9
Method: T990 Max. Dry D	Density: 121.4	Optimum Moisture: 101	_	,
d Took No.		8-1		
Test No.  (a) Wet Soil + Tare  (b) Mold Tare  (c) [a-b] Wet Wt.	1010	2004	<u>C</u>	D
(a) Wet Soil + Tare (b) Mold Tare	6249	6281	6263	6317
(c) [a-b] Wet Wt.	4242	4242	4243	4242
	132.6	4,50	4,46	4.35
Dry Density [ 4 ]	120,9	133.0	133.01	130,5
d ————————————————————————————————————		SHTO T 99 and 13.33	for AASHTO T 180.	110.7
·	<del></del>	<u> </u>		<u></u>
Pan No.  (r) Wet Soil Wt. + Tare,  (s) Dry Soil Wt. + Tare  (t) Container Tare Wt.  (u) Dry Soil Wt. [s-t]	608.4	553,9	623,6	<u>E</u> 657.1
g (s) Dry Soil Wt. + Tare	569.8	5/9.7	575,1	576,9
(t) Container Tare Wt.	171.1	221.4	213,6	2085
(u) Dry Soil Wt. [s-t]	398,7	298,31	361.5	387.4
(v) Water Wt. [r-s]	38.6	34,2	48,5	61.2
(v) Water Wt. [r-s] (w) % Moisture [-\frac{1}{4}-(100)]	9.7	11.5	13,4	15.8
å 122 <del>1</del>	· · · · · · · · · · · · · · · · · · ·			
Dry Density (lbs/1t <sup>3</sup> )	M 7	Mus.		
	8 10	12 Moisture (% of Dry We	14 16 ight)	18

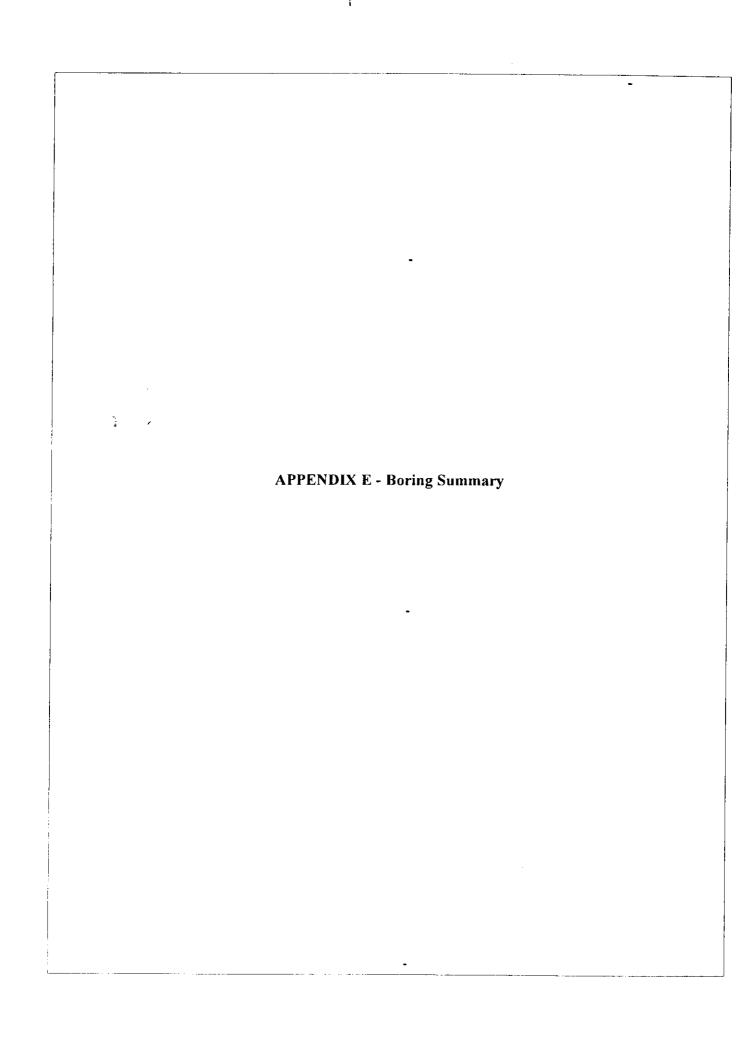


Form PHWA 1984 (P-60)

## WORKSHEET FOR LIQUID LIMIT AND PLASTIC LIMIT OF SOILS AASHTO T 89 AND AASHTO T 90

B Weight of wet soil and container   39, 29   37, 09   20, 37   20, 1				······································	······································
Sample of   Soil   Lot No.   Sample No.   BL-3	Project SHIL 500(1)	Source			
Test   Description   PLASTIC LIMIT   PLASTIC	Where sampled	Quant		·····	
Descripted By:   Description		<del></del>	S	emple No. <u>B</u> é	4-3
TEST  UCUID LIMIT (%)  PLASTIC LIMIT (%)  TEST NUMBER  1	Sampled By: Date: <u>8/29</u>	Ae 10000			
TEST NUMBER  1 2 1 2  No. of blows (liquid limit teet)  27 30  Container No.  A Tare weight of container  5, 30 15,54 15,74 15,44  8 Weight of wet soil and container  7, 30 15,54 15,74 15,44  8 Weight of wet soil and container  7, 30 15,54 15,74 15,44  8 Weight of wet soil and container  7, 30 15,54 15,74 15,44  8 Weight of wet soil and container  7, 30 15,54 15,74 15,44  8 Weight of dry soil (C - A) 19,23 17,09 20,37 20,1  9 Weight of dry soil (C - A) 19,23 17,28 3,84 3,99  E Weight of moieture (8 - C) 41,27 0,79 0,70  F Percent moieture (8 - C) 41,27 20,6 17,5  Uquid Limit 25,0 25,2  Flastic Limit (Meen) 19  PLASTIC INDEX (G - H) 6   PLASTIC INDEX (G - H) 6		·			•
1	TEST		1		
No. of blows (figuid limit teet)   27   30	TEST NUMBER	-	1		
Container No.  A Tare weight of container  A Tare weight of container  B Weight of wet soil and container  B Weight of wet soil and container  C Weight of dry soil and container  C Weight of dry soil [C - A]  D Weight of dry soil [C - A]  E Weight of moleture [8 - C]  P Percent moleture [8 - C]  D Uquid Limit   25.0   25.2    PLASTIC INDEX [G - H]  B   A  O   A 3   A4   A4    A   15, 74   15, 74    A   15, 74   15, 74    A   15, 74   15, 74    A   15, 74   15, 74    A   17, 58   19, 41    A   19, 23   17, 28   3, 84    A   3,99    A   17, 28   3, 84    A   3,99    A   17, 5    A   17				· · · · · · · · · · · · · · · · · · ·	<del></del>
A Tare weight of conteiner  8 Weight of wet soil and container  9 39, 29 37, 09 20, 37 20, 1  C Weight of dry soil and container  9 4, 53 32, 82 19, 58 19, 4  D Weight of dry soil [C - A]  E Weight of molesture [8 - C]  P Percent molesture [\$\frac{8}{D}\$(100)]  10 Usuid Limit				A13	A4
## Weight of wet soil and container ## 39,89 37,09 20,37 20,1 C Weight of dry soil and container ## 34,53 32,82 19.58 19.4 D Weight of dry soil (C-A) ## 19.23 17,28 3.84 3.99 E Weight of moisture (B-C) ## Percent moisture (B-C) ## 24,87 0,79 0.70			•		15,42
D Weight of dry soil (C - A)  E Weight of molecure (8 - C)  P Percent molecure ( (100))  Uquid Limit   25,0   25, 2    Plastic Limit (Meen)   19  PLASTIC INDEX (G - H)   6		39,29	37.09	20,37	20,11
E Weight of molecure [8-C]  P Percent molecure [\$\frac{1}{0}\$(100)]  Uquid Limit   25,0   25, 2    Plastic Limit   [F]   20,6   17,5    4. PLASTIC LIMIT (Meen)   19    PLASTIC INDEX [a · H]   6	C Weight of dry soil and container	34.53	32.82	19.58	19.41
Percent moisture [ 1 (100)]  1 24.8 24.7 20.6 17.5  1 25.0 25.2  Pleaste Limit <sup>2</sup> [F] 20.6 17.5  1 Liquid Limit <sup>1</sup> (meen) 25  1 PLASTIC LIMIT (Meen) 19  PLASTIC INDEX [0 - H] 6	D Weight of dry soil (C - A)	19.23 -		3.84-	3,99
Liquid Limit 25.0 25.2  Pleade Limit [F] 20.6 17.5  G. LIQUID LIMIT (meen) 25  H. PLASTIC LIMIT (Meen) 19  PLASTIC INDEX [G · H] 6	E Weight of moleture [8 - C]	4.76	4.27	10.79	0.70
Plastic Umit <sup>2</sup> [F] 20.6 17.5  G. LIQUID LIMIT (meen) 25  H. PLASTIC LIMIT (Meen) 19  PLASTIC INDEX (G · H) 6	F Percent moleture [ # (100) ]	24.8	24.7-	20,6	17.5
Plastic Umit <sup>2</sup> [F] 20.6 17.5  G. LIQUID LIMIT (meen) 25  H. PLASTIC LIMIT (Meen) 19  PLASTIC INDEX (G · H) 6	Liquid Limit <sup>1</sup>	25,0	25,2		
G. LIQUID LIMIT (meen)  H. PLASTIC LIMIT (Meen)  PLASTIC INDEX (G · H)  6  M. A. Muriu		<u> </u>	<del></del>		
PLASTIC INDEX (G · H) 6			Pleade Limit <sup>2</sup> [F]	20,6	17.5
PLASTIC INDEX (G · H) 6	G. LIQUID LIMIT	(meen) 2	5		
M of Nine		н.	PLASTIC LIMIT (I	Mean)	9
M of Niva	PLASTIC INDEX (G · H)	•			
	•		(\)	n al Nu	va





### TABLE E-1 SUMMARY OF PAVEMENT BORINGS PITTSBURG LANDING ROAD I

		G LANDING ROAD I	Ministration and the second se
Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PLI-1	90	40	A-6 (11)
PLI-2	90	90	Silty Clay
PLI-3	110	120	Clay
PLI-4	90	120	Sandy Clay
PLI-5	90	120	A-6 (3)
PLI-6	90	120	
PLI-7	70	120	
PLI-8	90	70	
PLI-9			Silty Clay
PLI-10			A-6 (12)
PLI-11			A-6 (13)
PLI-12	110	70	

## TABLE E-2 SUMMARY OF PAVEMENT BORINGS PITTSBURG LANDING ROAD II

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PLII-1	90	70	A-6 (11)
PLII-2	70	120	Clay
PLII-3	?	?	A-2-4 (0)

## TABLE E-3 SUMMARY OF PAVEMENT BORINGS ENTRANCE ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
E-1	30	130	A-6 (16)
E-2	40	40	A-7-6 (17)

## TABLE E-4 SUMMARY OF PAVEMENT BORINGS SERVICE ROAD

Boring		Aggregate Base Thickness (mm)	Subgrade
S-1	90	100	A-7-6 (25)

#### TABLE E-5 SUMMARY OF PAVEMENT BORINGS VISITOR CENTER PARKING

VISITOR CENTERT ARKING				
Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade	
VC-1	100	140	A-6 (13)	
VC-2	80	220	Clay	
VC-3	90	90	A-6 (9)	
VC-4	70	150	Silty Clay	
VC-5	100	110	A-6 (18)	
VC-6	130	80	Clay	

#### TABLE E-6 SUMMARY OF PAVEMENT BORINGS CORINTH-PITTSBURG LANDING ROAD

Boring	Boring Concrete Thickness (mm) AC Thickness (mm) Subgrade				
CP-1	160		A-6 (13)		
CP-2	130		Silty Clay		
CP-3	160		<b>A-</b> 6 (10)		
CP-4	130		Silty Clay		
CP-5	130		A-6 (13)		
CP-6	120		Silty Clay		
CP-7	120	70	A-4 (0)		
CP-8	150	30	A-2-4 (0)		
CP-9	130	90	A-4 (0)		
CP-10	130		A-6 (14)		
CP-11	130		A-6 (1)		

Boring	Concrete Thickness (mm)	AC Thickness (mm)	Subgrade
CP-12	120		Silty Clay

## TABLE E-7 SUMMARY OF PAVEMENT BORINGS MCCLERNAND ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
MS-1	80	None	A-6 (13)
MS-2	80	None	Silty Clay
MS-3	30	None	A-6 (17)
MS-4	None	None	A-6.(17)
MS-5	100	None	Silty Clay

## TABLE E-8 SUMMARY OF PAVEMENT BORINGS RECONNOITERING ROAD

	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
R-1	80	70	A-7-6 (18)
R-2	?	?	Silty Clay
R-3	80	60	A-7-6 (23)

## TABLE E-9 SUMMARY OF PAVEMENT BORINGS RHEA SPRINGS ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
RS-1	80	None	A-6 (4)
RS-2	120	None	A-7-6 (20)
RS-3	<del></del>	None	Silty Clay
RS-4	130	140	
RS-5	160	140	
RS-6	70	None	

## TABLE E-10 SUMMARY OF PAVEMENT BORINGS EASTERN CORINTH ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
EC-1	110	140	A-6 (15)
EC-2	90	100	Silty Clay
EC-3	100	130	A-7-6 (16)

#### TABLE E-11 SUMMARY OF PAVEMENT BORINGS TH PARKING

		THITIMENTO	
Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
T-1	90	None	
T-2	90	None	
Т-3			A-6 (15)
T-4	•-		Silty Clay

### TABLE E-12 SUMMARY OF PAVEMENT BORINGS HAMBURG-SAVANNAH ROADS

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
J-1		<u></u>	A-4 (0)
J-2	90	None	
J-3	70	None	

#### TABLE -13 SUMMARY OF PAVEMENT BORINGS PEACH ORCHARD PARKING LOT

		temme i induito poi	
Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
PO-1	70	None	A-6 (17)
PO-2	60	None	Silty Clay

## TABLE E-14 SUMMARY OF PAVEMENT BORINGS BLOODY POND TOUR STOP

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
BP-1	90	None	A-4 (1)
BP-2	60	None	A-6 (7)

#### TABLE E-15 SUMMARY OF PAVEMENT BORINGS BROWN'S LANDING ROAD

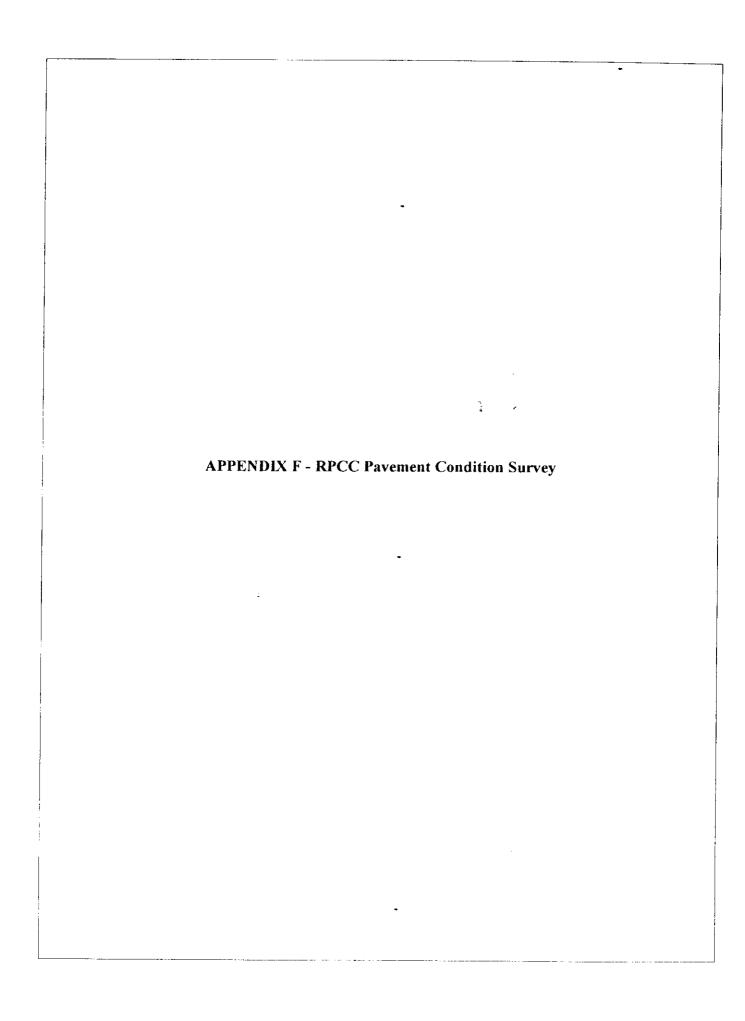
DROWN S DANDING ROAD						
Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade			
BL-1			A-2-4 (0)			
BL-2	• •		A-6 (9)			
BL-3	# ·		Silty Clay			
BL-4			A-6 (11)			
BL-5			A-6 (15)			

## TABLE X-16 SUMMARY OF PAVEMENT BORINGS VISTA

11 (1)			
	ASSISTED AND ADDRESS OF THE PROPERTY OF THE PR	A composite Dose	
		70 - 1 - 7 - 7	Dubelauc
		Programme and the control of the con	
	<del></del>		

## TABLE X-17 SUMMARY OF PAVEMENT BORINGS HAMBURG-SAVANNAH ROAD

Boring	AC Thickness (mm)	Aggregate Base Thickness (mm)	Subgrade
HS-1	60	None	Silty Clay
HS-2	80	None	Clay
HS-3	70	None	Silty Clay
HS-4	90	None	Silty Clay



# TABLE 1 - RPCC PAVEMENT CONDITION SURVEY RESULTS AND RECOMMENDATIONS CORINTH - PITTSBURG ROAD

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
Li	2M		I.45	lН	
L3	1H, 3L		L46	211	Fix 2' at 45/46 on 46 side
L4	1L, 3L		L48		Exposed reinforcement near 48/49
L5	IМ		L50	1H	
L7	1H	+ Blow out	L54	ΙΗ	
L8	IM		L56/57		Corner crack & spalling 2'
L9	lH		L57	1M	
L10	lН	+ a pothole	L60	1H	
L12	1H	+ 2 potholes	L65	ıн	
L14	211	At the corner	L66	lΗ	
L19	1H	+ potholes & 3M	L73	2H	Fix 1.5' at 73/74 on 73 side
L19/20, R19/20	2H	Fix 4' either side of joint.	L74	lН	
L21, R21	21-1	Fix 2' at edge 20/21 either side of joint	L75	1H	2 cracks
L21/L22	3M	Fix 3' either side.	L76	1H	
L22/L23	3M, 3L	Fix 6' either side.	L77	ıн	
L23/L24	3M, 3L	Fix 3' either side.	L84	1H	
L27	lН	w/ spall at end of crack.	L85	2H	Fix 1.0' at 85/86 on 85 side
L30/L31	2Н	Fix 2' either side.	L90	1H.	L91 ramp to H-S Rd.
L31	1H		L93	111	
L32	1H		L95	1H	
L33	1M	+ corner crack & spalling, fix 2' at 33/34 on 33 side	L97	ΙH	L98 H-S Rd.
L35	1M		L99	2H	Fix 1.0' at 99/100 on 99 side
L37	lH		L104	1/2H	Fix 1.0' at 104/105 on 104 side
L38	IM	At new entrance road.	L106	1H	
L39	3L		L107	lΗ	Several patches
I.40	1L	+ 3L	L111	1H	

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
L43	1H		L113	īН	
L115	lН		L218	1H	
L120	1H		L221	1H	
L121	1L		L223	111	
L132	1H		L229	ΙH	At McClernand Rd.
L133	1L	Fix 1.5' at 133/134 on 133 side	L233	1M	
L134a	1Н	UDC Monument- turnaround - Replace entire UDC turnaround	L238	ìМ	
L135a	Potholes	UDC Monument- turnaround	L242	IH	
L134/135, R134/135	2H	Fix 3' either side joint.	L243	1,3H	Replace the half on L242 side
L136a	1M	UDC Monument- turnaround	L244	1H	
L142	1 <b>H</b>		L247	211	Fix 2' at 246/247 on 247 side
L146	īН		L254	2H	Fix 1' at 254/255 on 254 side
L147		E-C Rd.	L261	114	
L158	1H		L263	1H	
L165	ıн		L269	1H	At H-P Rd.
L168	1Н		L271	lН	
L179	1M		L272	1H	
L185	1M		L273	1H,2M	
L185/186 R185/186	2H	Fix 2.5' either side joint.	L275	lH	
L190 L189/190	1H 2H	Fix 1.5' at 189/190 on 190 side	L286	1H	
L192	1H		L292	1M	
L201	111		L296	111	
L205	ΙΗ		L315	Ш	
1.209	1H		L317	2H	Fix 2' at 316/317 on 317 side
L211	IH		L324	1H	

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
L214	Pothole	0.25'dia. at center of slab	L327	lН	
L329/330	H joint spalling	Fix 2' on either side	L360	1H	
L330/329	H joint spalling	Fix 2' on either side	L361	lH	
b/w L333 to 337 a this section).	re 2 box culv	erts w/ AC o/L (reconstruct	L362	IH	
L338_	lН		L363	1H	
L340	ıн		L365	lM	
L340/341	II joint spalling	Fix 2' on either side	L375	1H	
L344/345	H joint spalling	Fix 2' on either side	L377	ìН	
L349	1Н		L381	1H	
L350	1H		L384	lН	
L351/352	H joint spalling	Fix 2' on either side	L387	IM	
L352	1M		L396	ΙΗ	
L354	1H	3 transverse cracks	L403	1H	
L355	1H	several transverse cracks	I.405	1H	
L356	111	2 transverse cracks			
L357/358	L patch				

# TABLE 1 - RPCC PAVEMENT CONDITION SURVEY RESULTS AND RECOMMENDATIONS CORINTH - PITTSBURG ROAD

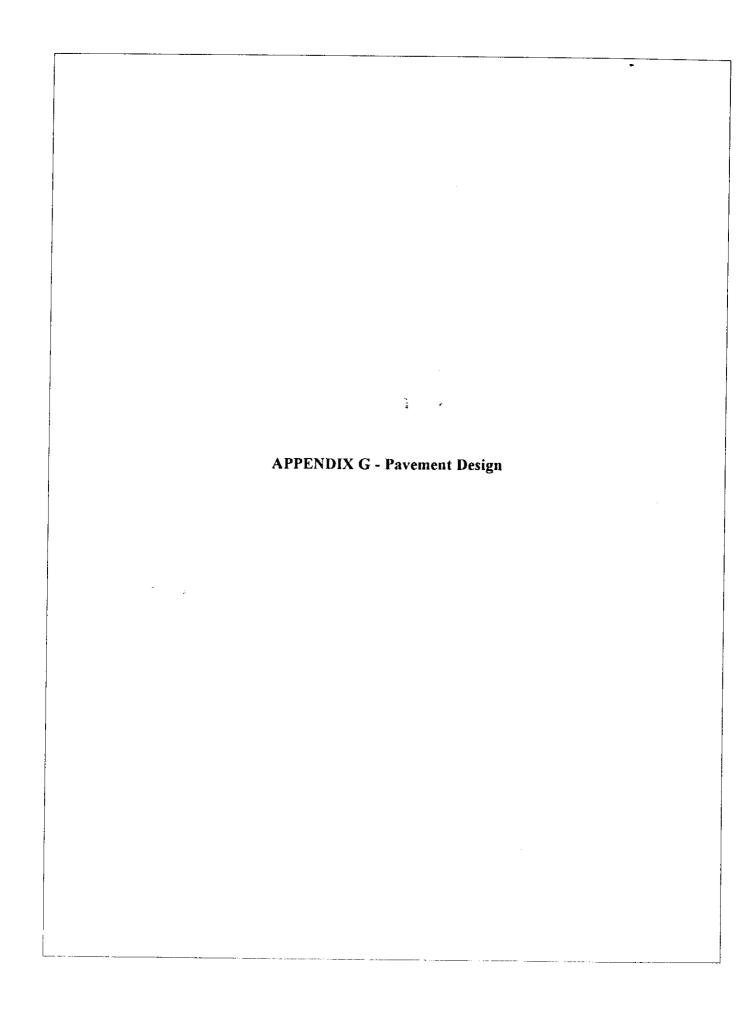
Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
R419	ІН		R376/375	211	Fix 2' each side
R413/412	H joint	Fix joint 2' each side	R373/372	211	Fix 2' each side
R412/411	H joint	Fix joint 2' each side	R372	1H	
R410/409	H joint	Fix joint 2' each side	R372/371	2M	Fix 1' each side
R409/408	2H	Fix joint 2' each side	R371/370	2M	Fix 2' each side
R407/406	2Н	Fix joint 1' on 407 side	R370/369	2M	Fix 1' each side
R404/403	2H	Fix joint 1' each side	R369/368	2M	Fix 1' each side
R403/402	2H	Fix 2' each side	R368	lН	
R402	lH		R368/367	2M	Fix 1' each side
R402/401	2H	Fix joint 2' each side	R367/366	2M	Fix 3' each side
R401/400	211	Fix joint 2' each side	R365/364	2M	Fix 2' each side
R400	lН		R364	ΙΗ	
R398/397	2H	Fix 1' each side	R363/362	2M	Fix 2' each side
R397	1,3L		R361	1H	
R396	1M		R356	1H	
R396/395	2M	Fix 2' each side	R354	IН	Fix 2' at 354/353 on 354 side
R395/394	Bad Joint	Fix 2' each side	R352/351	2M	Fix 2' on 352 side
R394	1L		R350	1 <b>M</b>	
R393	1H		R345	lН	
R392/391	Bad Joint	Fix 1' each side	R345/344	2H	Fix 2' on each side
R390/389	Bad Joint	Fix 1' each side	R344/343	2H	Fix 2' on each side
R387	1H		R343/342	2H	Fix 1' on each side
R384	1H		R342	111	
R383	1M		R341	1H	
R381/380	Bad Joint	Fix I' each side	R341/340	Bad Joint	Fix 1' on each side
R380/379	Bad Joint	Fix 2' each side	R340	1H	
R376	111		R338	111	

Replace Slab	Defects	Comments	Replace Slat	Defects	Comments
b/w R333 to R337 (reconstruct this see	are two box cu	ilverts w/ AC o/L			
R330/329	joint spalling	Fix 2' each side			
R329/328	2H	Fix 3' at 328 side			
R327	ιH				
R324	1H				
R323/322	2H	Fix 2' each side			
R322	lН				
R321/320	2H	Fix 2' on 321 side			
R319	1H			<del></del>	
R317	1H		Gore area adjacent to R265/264	1H	
R315	1H		R262	lН	
R309	1H		R259	1H	
R307	1H		R257	IM	
R302	111		R253	ΙH	Extra slabs on rt.
R296	lН		R237	IН	
R292	1H		R228	IH	
R286	1Н		R224	IH.	At McClernand Rd.
R280	1H		R221	111	
R275	1H		R218	1H	
R272	1H		R215	1H	
R271	1H		R213	1H	
R269	ιH				
R268	iН				
R266	1H				
R265	1Н				
R263	1H				
R261	111				

Replace Slab	Defects	Comments	Replace Slab	Defects	Comments
R206	1M		R92	lН	
R196	lH	Extra slabs on rt.	R88	1H	
R184	lН		R87	lН	
R180/179	2M	Fix 2' each side	R83	ìН	
R178	lM		R81	1H	
R178/177	2M	Fix 2' each side	R78	lН	
R176/175	2M	Fix 3' each side	R77	1H	
R170	1H		R68	ΙH	
R167	lН		R62	ΙΗ	
R162	1H		R57	lН	
R160/159	2Н	Fix 4' each side	R52	1H	
R159	lH	At culvert	R45	IН	
R152	lM		R39/38	Bad Joint	Fix 2' each side
R148	lН		R37/36	2M	Fix 2' each side
R142	lН		R34	lH	
R141/140	2M	Fix 2' each side	R32	lН	
R140	1H		R27	IН	
R140/139	2M	Fix 2' each side	R22	lH	
R139/138	2M	Fix 2' each side	R19	114	
R136/135	2M	Fix 2' each side	R13	lН	
R131/130	2M	Fix 2' each side	R12/11	Bad Joint	Fix 2' each side
R128/127	2Н	Fix 2' each side	R11/10	2M	Fix 2' each side
Reconstruct AC pull- monument.	off on opp. si	de of road from UDC	R10	ΙΗ	
R127/126	2M	Fix 2' each side	R10/9	2M	Fix 2' each side
R124	111		R2	1H	
R122	ΙΗ		Defect Legend		*
R119	1H,2M		1 = transverse crac 2 = corner break	ck near mid-	-slab
R108	lH		3 = longitudinal cr	racks along	dowels
R104	1H		L = Low severity		
R99	IH,2M		M = Medium seve H = High severity	rity	
R97/96	2M	Fix 2' each side	·		
R96/95	2M	Fix 2' each side			

Replace Slab	Defects	Comments ****	Replace Slab	Defects	Comments ***
			- <u> </u>		
	· · · · · · · · · · · · · · · ·			·	

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#### 1997 AASHTO Pavement Design

## DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

#### Flexible Structural Design Module

Brown's Road Widening and parking area

CBR = 7

#### Flexible Structural Design

80-kN ESALs Over Initial Performance Period	26,331
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Roadbed Soil Resilient Modulus	72,398 kPa
Stage Construction	1
Calculated Design Structural Number	41 mm

#### **Rigorous ESAL Calculation**

Performance Period (years)	20
Two-Way Traffic (ADT)	284
Number of Lanes in Design Direction	l
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

			Average Initial	Annual %	Accumulated
	Percent	Annual	Truck Factor	Growth in	80-kN ESALs
Vehicle	of	%	(ESALs/	Truck	over Performance
<u>Class</u>	<u>ADT</u>	<u>Growth</u>	Truck)	<u>Factor</u>	Period
1	98.5	2	0.0004	0	497
2	1	2	1.75	0	22,053
3	0.5	2	0.6	0	3,781
Total	100	-	-	-	26,331

Growth Compound

Total Calculated Cumulative ESALs 26,331

#### Specified Layer Design

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	( <u>Ai</u> )	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Surface Course	0.44	i	40	7.35	18
2	HACP Base Course	0.4	1	60	7.35	24

		Struct	Drain		•	
<u>Layer</u> 3 Total	Material Description Aggregate Base Course	Coef. <u>(Ai)</u> 0.14	Coef. ( <u>Mi)</u> I	Thickness (Di)(mm) 200	Width (m) 7.35	Calculated SN (mm) 28
Total		-	-	300	-	70

\*

#### 1997 AASHTO Pavement Design

## DARWin Pavement Design and Analysis System

#### A Proprietary AASHTOWare Computer Software Product

#### Overlay Design Module

Pittsburg Landing Road I and Visitor Center/Cementery Parking Areas

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

44 mm

<u>Design Method</u> Component Analysis	Effective Existing  Structural Number (mm)  35	Overlay <u>Structural Number (mm)</u> 9
Remaining Life	•	_
Non-Destructive Testing	<u>-</u>	_

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	41,165
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,389 kPa
Calculated Structural Number for Future Traffic	44 mm

44 mm

#### **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description  1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.25 0.1	Drainage <u>Coefficient</u> I I	Thickness (mm) 90 120
Milling Thickness	0 mm		
	Calculated Results*		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	35 mm 35 mm		

<sup>\*</sup>Note: This value is not represented by the inputs or an error occurred in calculation.

#### **Future Rigorous ESAL Calculation**

Performance Period (years) 20 Two-Way Traffic (ADT) 444

Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

	Percent	Annual	Average Initial Truck Factor	Annual % Growth in	Accumulated
Vehicle	of	%	(ESALs/	Truck	80-kN ESALs
Class	ADT	Growth	Truck)	Factor	over Performance
1	98.5	2	0.0004	0	Period
2	1	2	1.75	0	776 34,478
3	0.5	2	0.6	0	5,910
Total	100	-	-	-	41,165

Growth Compound

Total Calculated Cumulative ESALs 41,165

## Structural Number for New Existing Pavement

<u>Layer</u> 1 2	Material Description AC Surface Granular Base	Structural <u>Coefficient</u> 0.25 0.1	Drainage <u>Coefficient</u> I I	Thickness (mm) 90 120
Milling 7	Thickness	0 mm		
		Calculated Results		

Calculated New Structural Number Before Milling
Calculated New Structural Number
35 mm
35 mm

## **Specified Layer Design**

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
Layer	Material Description	(Ai)	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

Days 1

# DARWin Pavement Design and Analysis System

## A Proprietary AASHTOWare Computer Software Product

## Overlay Design Module

Visitor Center Use ADT from Pittsburg landing Rd II CBR = 6

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

16 mm

	Effective Existing	Overlay
Design Method	Structural Number (mm)	Structural Number (mm)
Component Analysis	32	0
Remaining Life	-	
Non-Destructive Testing	-	_

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	228
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa

Calculated Structural Number for Future Traffic

16 mm

# **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description  1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.2 0.1	Drainage <u>Coefficient</u> ! !	Thickness (mm) 95
Milling Thickness	0 mm		
	Calculated Results*		
Calculated Pavement Structural Number Before Milling	32 mm		

Calculated Effective Pavement Structural Number 32 mm

\*Note: This value is not represented by the inputs or an error occurred in calculation.

## **Future Rigorous ESAL Calculation**

Performance Period (years)

Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %

Vehicle <u>Class</u> Total	Percent of <u>ADT</u>	Annual % <u>Growth</u> -	Average Initial Truck Factor (ESALs/ <u>Truck)</u>	Annual % Growth in Truck <u>Factor</u>	Accumulated 80-kN ESALs over Performance <u>Period</u> -
Growth			Simple		

Simple

Total Calculated Cumulative ESALs

\*Note: This value is not represented by the inputs or an error occurred in calculation.

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
Layer	Material Description	<u>(Ai)</u>	<u>(Mi)</u>	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

# DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

#### Overlay Design Module

Entrance road - AC Overlay
Using same ADT as Pittsburg landing Road I

#### **AC** Overlay of **AC** Pavement

Structural Number for Future Traffic

44 mm

	Effective Existing	Overlay
Design Method	Structural Number (mm)	Structural Number (mm)
Component Analysis	17	27
Remaining Life	•	_
Non-Destructive Testing	;	_

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	41,165
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
	·

#### Calculated Structural Number for Future Traffic 44 mm

# **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description  1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.25 0.1	Drainage <u>Coefficient</u> I I	Thickness ( <u>mm)</u> 35 85
Milling Thickness	0 mm		
	Calculated Results		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	17 mm		

Performance Period (years)	20
Two-Way Traffic (ADT)	444
Number of Lanes in Design Direction	ŧ
Percent of All Trucks in Design Lane	100 %

Vehicle Class 1 2	Percent of <u>ADT</u> 98.5 I	Annual % <u>Growth</u> 2 2	Average Initial Truck Factor (ESALs/ <u>Truck)</u> 0.0004 1.75	Annual % Growth in Truck <u>Factor</u> 0 0	Accumulated 80-kN ESALs over Performance Period 776 34,478
3 Total	0.5 100	2	0.6	0 -	5,910 41,165

Total Calculated Cumulative ESALs

41,165

Compound

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	<u>(Ai)</u>	(Mi)	<u>(Di)(mm)</u>	<u>(m)</u>	SN (mm)
l	HACP Overlay	0.44	1	62	-	27
Total	-	-	-	62	- F	27

# DARWin Pavement Design and Analysis System

## A Proprietary AASHTOWare Computer Software Product

#### Overlay Design Module

Brown's Landing Road CBR = 7

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

41 mm

	Effective Existing	Overlay
<u>Design Method</u>	Structural Number (mm)	Structural Number (mm)
Component Analysis	23	18
Remaining Life	-	-
Non-Destructive Testing	-	

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	26,145
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	41 mm

# Effective Pavement Thickness - Component Analysis Method

Layer Material Description  1 HACP Surface Course	Structural Coefficient 0.25	Drainage <u>Coefficient</u> I	Thickness <u>(mm)</u> 90
Milling Thickness	0 mm		
	Calculated Results		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	23 mm 23 mm		

Performance Period (years)	20
Two-Way Traffic (ADT)	282
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	50 %

Vehicle <u>Class</u> I	Percent of <u>ADT</u> 98.5	Annual % <u>Growth</u> 2	Average Initial Truck Factor (ESALs/ Truck) 0.0004	Annual % Growth in Truck <u>Factor</u> 0	Accumulated 80-kN ESALs over Performance <u>Period</u> 493
2	1	2	1.75	0	21,898
3 Total	0.5	2	0.6	0	3,754
Iotai	100	-	-	-	26,145

Compound

Total Calculated Cumulative ESALs

26,145

# **Specified Layer Design**

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	<u>(Ai)</u>	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
- 1	HACP Overlay	0.44	1	40	-	18
Total	-	-	-	40	-	18

10

# DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

## Overlay Design Module

McClemand Road - Overlay Section
ADT data from Corinth-Pittsburg Landing Rd = 345 (1995)
CBR = 6

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

50 mm

<u>Design Method</u> Component Analysis Remaining Life Non-Destructive Testing Effective Existing
Structural Number (mm)
19

Overlay
<u>Structural Number (mm)</u>

31

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	63,972
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 kPa

Calculated Structural Number for Future Traffic

50 mm

## **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description 1 HACP Surface Course	Structural - Coefficient 0.25	Drainage <u>Coefficient</u> 1	Thickness (mm) 75
Milling Thickness	0 mm		

Calculated Results

Calculated Pavement Structural Number Before Milling
Calculated Effective Pavement Structural Number

19 mm 19 mm

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lancs in Design Direction	ı .
Percent of All Trucks in Design Lane	100 %

Vehicle <u>Class</u>	Percent of <u>ADT</u>	Annual % <u>Growth</u>	Average Initial Truck Factor (ESALs/	Annual % Growth in Truck	Accumulated 80-kN ESALs over Performance
1		Grown	Truck)	<u>Factor</u>	<u>Period</u>
1	98.5	2	0.0004	0	1,206
2	1	2	1.75	0	53,580
3	0.5	2	0.6	0	9,185
Total	100	-	-	-	63.972

Compound

Total Calculated Cumulative ESALs

63,972

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	( <u>Ai</u> )	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	1	70	-	31
Total	-	-	-	70	-	31

# DARWin Pavement Design and Analysis System

#### A Proprietary AASHTOWare Computer Software Product

## Overlay Design Module

Rhea Springs Road CBR = 7

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

39 mm

Design Method
Component Analysis
Remaining Life
Non-Destructive Testing

Effective Existing
Structural Number (mm)
25

Overlay
<u>Structural Number (mm)</u>

14

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	21,139
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	39 mm

## **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description  1 HACP Surface	Structural Coefficient 0.25	Drainage <u>Coefficient</u> l	Thickness (mm) 100
Milling Thickness	0 mm		
	Calculated Results		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	25 mm 25 mm		

Performance Period (years)	20
Two-Way Traffic (ADT)	114
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %
Percent Trucks in Design Direction	100 %

Vehicle <u>Class</u>	Percent of <u>ADT</u>	Annual % <u>Growth</u>	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck <u>Factor</u>	Accumulated 80-kN ESALs over Performance
1	98.5	2	0.0004	<u>1 actor</u> 0	<u>Period</u> 399
2	1	2	1.75	0	17,705
3	0.5	2	0.6	0	3,035
Total	100	•	-	-	21,139

Compound

Total Calculated Cumulative ESALs

21,139

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	( <u>Ai</u> )	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	•	-	-	40	-	18

# DARWin Pavement Design and Analysis System

#### A Proprietary AASHTOWare Computer Software Product

#### Overlay Design Module

Reconnoitering Road CBR=7

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

39 mm

	Effective Existing	Overlay
Design Method	Structural Number (mm)	Structural Number (mm)
Component Analysis	27	12
Remaining Life	-	-
Non-Destructive Testing		_

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	21,139
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	72,398 kPa
Calculated Structural Number for Future Traffic	39 mm

#### **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description 1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.25 0.1	Drainage <u>Coefficient</u> I I	Thickness (mm) 80 65
Milling Thickness	0 mm		
	Calculated Results		

Calculated Pavement Structural Number Before Milling 27 mm Calculated Effective Pavement Structural Number 27 mm

Performance Period (years)	20
Two-Way Traffic (ADT)	114
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

Vehicle <u>Class</u> I	Percent of ADT 98.5	Annual % <u>Growth</u> 2	Average Initial Truck Factor (ESALs/ <u>Truck)</u> 0.0004	Annual % Growth in Truck <u>Factor</u> 0	Accumulated 80-kN ESALs over Performance <u>Period</u> 399
2	1	2	1.75	0	17,705
3	0.5	2	0.6	0	3,035
Total	100	-	-	-	21,139

Compound

Total Calculated Cumulative ESALs

21,139

## **Specified Layer Design**

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	<u>(Ai)</u>	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	I	40	_	18
Total	-	-	-	40	<u>.</u>	18

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# DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

#### Overlay Design Module

Eastern Corinth Road

CBR = 6

#### **AC** Overlay of AC Pavement

Structural Number for Future Traffic

45 mm

	Effective Existing	Overlay
Design Method	Structural Number (mm)	Structural Number (mm)
Component Analysis	37	8
Remaining Life	-	-
Non-Destructive Testing	•	<u>_</u>

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	31,986
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 <b>k</b> Pa
Calculated Structural Number for Future Traffic	45 mm

# **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description  1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.25 0.1	Drainage <u>Coefficient</u> 1	Thickness (mm) 100 120
Milling Thickness	0 mm		
	Calculated Results		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	37 mm 37 mm		

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lanes in Design Direction	1

Percent of All Trucks in Design Lane
Percent Trucks in Design Direction

100 % 50 %

Vehicle <u>Class</u>	Percent of <u>ADT</u>	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck	Accumulated 80-kN ESALs over Performance
1		Glown	· · · · · · · · · · · · · · · · · · ·	<u>Factor</u>	<u>Period</u>
ı	98.5	2	0.0004	0	603
2	1	2	1.75	0	26,790
3	0.5	2	0.6	0	4,593
Total	100	-	-	-	31,986

Growth

Compound

Total Calculated Cumulative ESALs

31,986

# Specified Layer Design

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	( <u>Ai</u> )	(Mi)	<u>(Di)(mm)</u>	<u>(m)</u>	SN (mm)
1	HACP Overlay	0.44	1	40	-	18
Total	-	• -	-	40	-	18

170000

# DARWin Pavement Design and Analysis System

# A Proprietary AASHTOWare Computer Software Product

## Overlay Design Module

Hamburg-Savannah Road
ADT = 345 (USED SAME ADT AS CORINTH-PITTSBURG)

#### **AC Overlay of AC Pavement**

Structural Number for Future Traffic

50 mm

Design Method Component Analysis	Effective Existing <u>Structural Number (mm)</u>	Overlay <u>Structural Number (mm)</u>
•	20	30
Remaining Life	-	-
Non-Destructive Testing	_	

#### Structural Number for Future Traffic

Future 18-kip ESALs Over Design Period	63,972
Initial Serviceability	4.2
Terminal Serviceability	2.2
Reliability Level	85 %
Overall Standard Deviation	0.49
Subgrade Resilient Modulus	62,055 <b>k</b> Pa
Calculated Structural Number for Future Traffic	50 mm

## **Effective Pavement Thickness - Component Analysis Method**

Layer Material Description 1 HACP Surface Course 2 Aggregate Base Course	Structural Coefficient 0.25 0.1	Drainage <u>Coefficient</u> I I	Thickness (mm) 80 0
Milling Thickness	0 mm		
	Calculated Results		
Calculated Pavement Structural Number Before Milling Calculated Effective Pavement Structural Number	20 mm 20 mm		

Performance Period (years)	20
Two-Way Traffic (ADT)	345
Number of Lanes in Design Direction	1
Percent of All Trucks in Design Lane	100 %

100 %

Vehicle	Percent of	Annual %	Average Initial Truck Factor (ESALs/	Annual % Growth in Truck	Accumulated 80-kN ESALs
<u>Class</u> I	<u>ADT</u> 98.5	Growth	<u>Truck)</u> 0.0004	Factor	over Performance Period
2	1	2	1.75	0	1,206 53,580
Total	0.5 100	- -	0.6	0 -	9,185 63,972

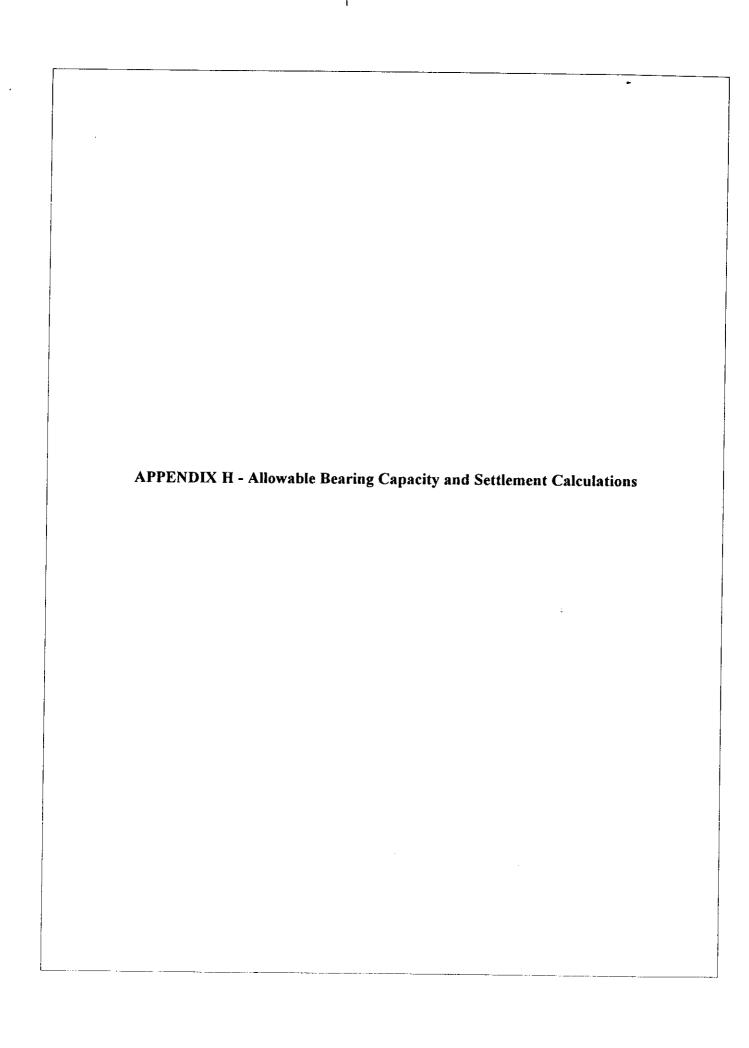
Growth

Compound

Total Calculated Cumulative ESALs

63,972

		Struct	Drain			
		Coef.	Coef.	Thickness	Width	Calculated
<u>Layer</u>	Material Description	( <u>Ai</u> )	(Mi)	(Di)(mm)	<u>(m)</u>	SN (mm)
1.	HACP Overlay	0.44	1	70	-	31
Total	-	-	-	70	-	31



Form FHWA-1460 U.S. DEPARTMENT OF TRANSPORTATION (Rev. 3-74) FEDERAL HIGHWAY ADMINISTRATION MADE BY KM DATE 51100 PROJECT SHIL 502(1) CHECKED BY ..... DATE ..... CALCULATIONS FOR SMALL Dridge foundation @ Recommentering SHEET NO. 113 ultimate scaring Capacity - using Meyerhof's bearing capacity egg. 1ant = chès q + d + d + d + 0 = 8 B + 2 d + 0 = Breed on the boring logs substitute. Soils

out the bridge size Consist of Silty Sand

et silly clay with SPT D-values ranging

from 2 to 30 dows per 300 mm. Avorage SPT Novalue will be used = 6 = assume C=0 (cohession less soils) = from +crole 3-4 (Foundation conclusion & Lesign) Calcale shape & Lepth factors:tor \$7.00 Su= S = 1+0.1 Kp = Assume B = 1.5 m, L = 6.5 m (one lane + = B| = 0.23  $K_{p} = + \alpha x \left( 45 + \frac{28}{2} \right) = 2.77$ = fq= fy = 1+0.1 (2.77) (0.23) =

 $-d_{q}=d_{s}=1+0.2 \text{ (kp)} \frac{2}{8}$   $D | B = \frac{0.76}{1.5}=0.51$ 

Form FHWA-1460 U.S. DEPARTMENT OF TRANSPORTATION (Rev. 3-74) FEDERAL HIGHWAY ADMINISTRATION MADE BY CM DATE CHECKED BY ..... DATE ..... CALCULATIONS FOR ..... = d=d = 1 + 0.2/2-77 (0.51) =1.17 From Toble 4-4 (Bowels) Ng= 14-7 & Ng= 11-2 : Sub. in ext. (1) chave CV = 17-64076 \* 147 \* 1.06 \* 1.17 + 0.5 4 17.641.5 41.2 41.06 41.19 = 243.86 + 183.35 = 427.21 KPa - 9 = 9 = 427-21 = 142-4 16 Pa me allowable bearing pressure of 142 KPa (= Z900 16/812) 7 680 Assuming no overburden = Q = 133-36 = 61.1 KPa (1270 16/42) = In case of no overbuiden with a footing with of 1.5 m - me allowable bearing capacity = 61 KPa (1270 16/9) Try 8 = 2.0 m (6.5') = 8/1= 0.31 Sq= Sp= 1.09; d= d= 1.17

 $S_{q} = S_{p} = 1.09 ; d_{q} = d_{p} = 1.17$   $S_{ult} = 243.9 + 0.5417.6 * 2.0 * 11.2 * 1.09 * 1.17$   $Z_{ult} = 243.9 + 0.5417.6 * 2.0 * 11.2 * 1.09 * 1.17$ 

Form FHWA-1460 U.S. DEPARTMENT OF TRANSPORTATION (Rev. 3-74) FEDERAL HIGHWAY ADMINISTRATION CHECKED BY ..... DATE ..... CALCULATIONS FOR Or = 243.9 + 281.89 = 495.29 K.Pa 9 = <u>A95.79</u> = 165.1 KPa (3446 161662) - with B= 2.0 m & D= 0.76 m = 9 = 165.0 KPa (3400 16/FFZ) - WITH B = 2-0 & D=0 = 9 = 83. KPa (1700 16/ft-2) - Try 8= 7.5 M = 8 1 = 238 + 300.85 = 538.85 CPa 9 = 538.85 = 179.6 KPG (3750 118)

40 overburden; 9 = 300-5 = 100-3 KPa